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ASTOUNDING

REG. U. S. PAT. OFF.

Science-Fiction

25 CENTS

MARCH 1945

DESTINY TIMES THREE

BY FRITZ LEIBER, JR.

MAR 45

Get after that cold in the 1st round

Gargle LISTERINE ANTISEPTIC

Quick!

THE TIME to fight a cold is at the very start . . . before potentially troublesome germs in the throat can stage a "mass invasion" of the tissue to aggravate the infection.

In short, attack these germs before they attack you.

Fewer Colds, Tests Showed

Listerine Antiseptic, used as a gargle, reaches way back on throat surfaces to kill millions of the "Secondary Invaders."

Medical men say that though many colds may be started by a virus, these threatening "Secondary Invaders" can make it complicated and are responsible for much of its discomfort and misery.

Prompt and frequent antiseptic action against them may help Nature nip the cold "in the bud," or reduce its severity once it has developed. That goes, too, for simple sore throat.

Tests made during twelve years of research bear this out. Here is what they showed:

That regular twice-a-day users of Listerine Antiseptic had fewer colds and sore throats, and usually had milder colds than non-Listerine Antiseptic users.

Note How Listerine Gargle Reduced Germs!

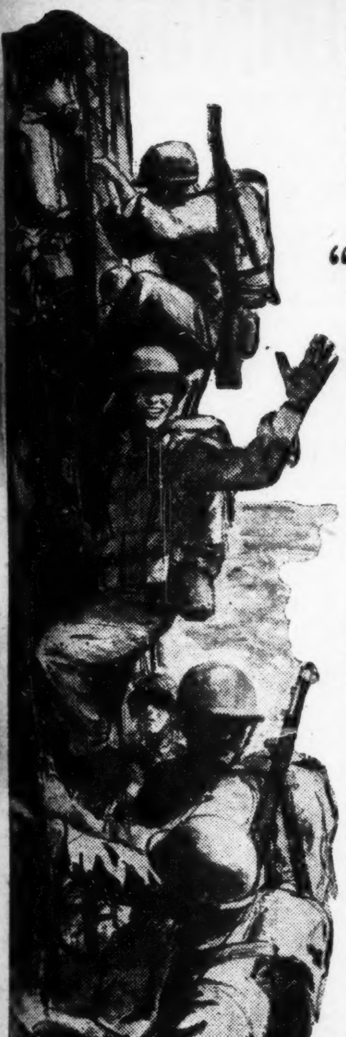
BEFORE
AFTER

Actual tests showed reductions of bacteria on mouth and throat surfaces ranging up to 96.7% fifteen minutes after the Listerine Antiseptic gargle, and up to 80% one hour after the Listerine gargle.

chill or cough, get started with Listerin Antiseptic *at once* and *use it often*. This intelligent precaution may help spare you a uncomfortable siege of illness.

LAMBERT PHARMACAL CO., *St. Louis, M*

IN SERVICE MORE THAN 60 YEAR



"I'LL BE SEEING YOU..."

I'LL BE SEEING YOU all the way from here to hell and gone. I'll be seeing you as the lights fade down in the ship's belly tonight and everything that is "home" blacks out and there's nothing but the cold impersonal slap of the ocean against the portholes.

And I'll be seeing you as the artillery blasts shells over our heads and the tanks shoulder past us on their way to "soften up" the enemy for our show – the doughboys' show. We're the ninth inning boys. Like my C.O. said – "You still got to crawl on your belly to get to Tokyo." We're the boys who have to get close enough to the enemy to stick a bayonet in him.

But why am I telling you all this, darling? You, my gentle little wife. Maybe it's because I'm scared – scared and lonesome *already!* I wish I could leap over there and start shooting right now, tonight. If I can only get the first shot over with in a hurry – get "baptized" quick – I'll be all right.

I'll be all right anyway. Because when my turn comes to move up to face that machine-gun chatter, I'll be seeing *you.* And when the traps and nests are all cleaned out and we've mopped up with the help of our planes, tanks and artillery – I'll be back. I've booked this ocean liner for a round trip. This is one doughboy that's coming back. I'll be seeing you . . . maybe.

Keep your eye on the Infantry...
the doughboy does it!

AST—1B

ASTOUNDING
SCIENCE FICTION

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Illustrations by Kramer, Orban and Williams

Editor
JOHN W. CAMPBELL, JR.

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$2.50 per Year in U.S. A. Printed in 100 the U. S. A. 25c per Copy

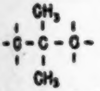
NEXT ISSUE ON SALE MARCH 20, 1945

Silicone Chemistry Report

With a little more data on silicone chemistry released for publication, a fuller picture of its importance to industry and technology is possible. And worth while.

So far, the data released at least, indicates that only the most elementary types of silicones have been investigated and applied to industrial use. In carbon organic chemistry, the hydrocarbon series is perhaps the simplest—the nonaromatic hydrocarbons almost certainly can be so rated. The silicones so far investigated are the silicon-organic chemical equivalent of the hydrocarbons—and are rather astonishingly parallel in physical properties.

The basic structural unit of the paraffin hydrocarbon series has the loose bonds connecting other carbon-groups to each other to form long or short chains. Silicone chains have a somewhat different basic group structure; the silicon atoms are not linked directly, since the direct silicon-silicon linkage is too subject to attack by oxygen, the omnipresent oxygen of air or water. Instead, a silicon-oxygen-silicon structure linkage is the basic unit:



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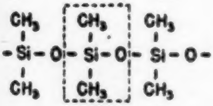

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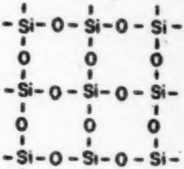
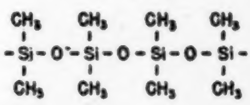
The dotted line surrounds the unit structure. The presence of the oxygen atom acts as a complete stopper for further encroachment of oxygen, apparently, for the silicones show an enormous resistance to oxygen attack, a far greater resistance, in fact, than the hydrocarbons do. The oxygen linkage appears in carbon-organic compounds, too, of course, but only in the ethers, and not as alternate units in long-chain compounds. In the silicones, it makes possible extremely long-chain compounds. It is interesting to notice, too, that the structure of a silicone-organic is very similar to the structure of the silicon-inorganic compound, quartz. The main difference is that quartz linkages are three-dimensional oxygen-silicon links, forming a powerfully cross-braced, extremely rigid crystal, while the silicone linkages are, because of the intervention of the methyl—CH_3—groups confined essentially to one dimension—length. (Actually, in space, the silicone bonding produces a series of dog-leg bends, producing a crooked, but very long molecule.)

QUARTZ



SILICONE



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The carbon-organic hydrocarbons start with gaseous methane and go on up through liquid hexane, octane, and duodecane—12-carbon chain molecule—to the heavy, extremely-long-chain solid paraffin waxes, greases, and the like. The silicone-organics form a similar progression, through light, volatile liquids, heavier oils, to thick greases. These are strikingly like the carbon-organics. They

(*Continued on page 138*)

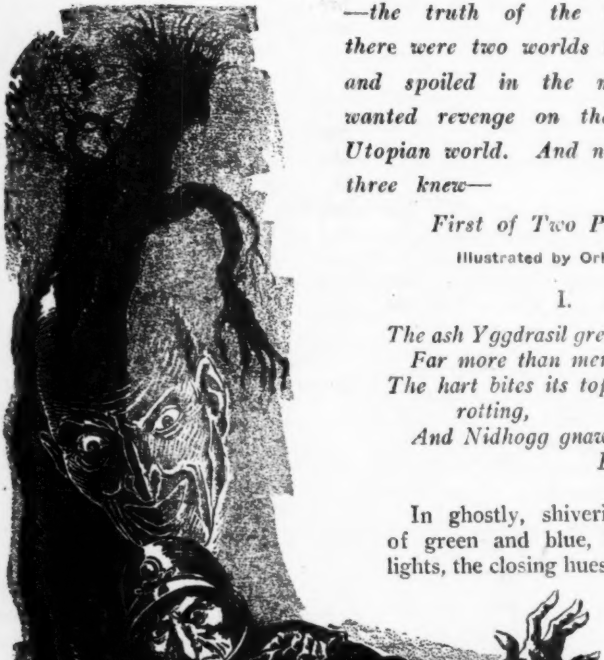
Destiny Times Three

by FRITZ LEIBER, Jr.

There were the self-made gods of destiny who knew—so they thought! —the truth of the thing. And there were two worlds they'd made, and spoiled in the making—that wanted revenge on the third, the Utopian world. And none of those three knew—

First of Two Parts.

Illustrated by Orban



I.

The ash Yggdrasil great evil suffers,
Far more than men do know;
The hart bites its top, its trunk is rotting,
And Nidhogg gnaws beneath.
Elder Edda.

In ghostly, shivering streamers of green and blue, like northern lights, the closing hues of the fourth

Hoderson symchromy, called "the Yggdrasil," shuddered down toward visual silence. Once more the ancient myth, antedating even the Dawn Civilization, had been told—of the three of life with its roots in heaven and hell and the land of the frost giants, and serpents gnawing at those roots and the gods fighting to preserve it. Transmuted into significant color by Hoderson's genius, interpreted by the world's greatest color instrumentalists, the primeval legend of cosmic dread and rottenness and mystery, of wheels within cosmic wheels, had once more enthralled its beholders.

In the grip of an unearthly excitement, Thorn crouched forward, one hand jammed against the grassy earth beyond his outspread cloak. The lean wrist shook. It burst upon him, as never before, how the Yggdrasil legend paralleled the hypothesis which Clawly and he were going to present later this night to the World Executive Committee.

More roots of reality than one, all right, and worse than serpents gnawing, if that hypothesis were true.

And no gods to oppose them—only two fumbling, overmatched men.

Thorn stole a glance at the audience scattered across the hillside. The upturned faces of utopia's sane, healthy citizenry seemed bloodless and cruel and infinitely alien. Like masks. Thorn shuddered.

A dark, stooped figure slipped between him and Clawly. In the last dying upflare of the symchromy—the last wan lightning stroke as the storm called life departed from the universe—Thorn made out a majestic, ancient face shadowed by a black hood. Its age put him in mind of a fancy he had once heard someone advance, presumably in jest—that a few men of the Dawn Civilization's twentieth century had somehow secretly survived into the present. The stranger and Clawly seemed to be conversing in earnest, low-pitched whispers.

Thorn's inward excitement reached a peak. It was as if his mind had become a thin, taut membrane, against which, from the farthest reaches of infinity, beat unknown pulses. He seemed to sense the presence of stars beyond the stars, time-streams beyond time.

The symchromy closed. There began a long moment of complete blackness. Then—

Thorn sensed what could only be described as something from a region beyond the stars beyond the stars, from an existence beyond the time-streams beyond time. A blind but purposeful fumbling that for a moment closed on him and made him its agent.

No longer his to control, his hand stole sideways, touched some soft fabric, brushed along it with infinite delicacy, slipped beneath a layer of similar fabric, closed lightly on a round, hard, smooth something about as big as a hen's egg. Then his hand came swiftly back and thrust the something into his pocket.

Gentle groundlight flooded the hillside, though hardly touching the black false-sky above. The audience burst into applause. Cloaks were waved, making the hillside a crazy sea of color. Thorn blinked stupidly. Like a flimsy but brightly-painted screen switched abruptly into place, the scene around him cut off his vision of many-layered infinities. And the groping power that a moment before had commanded his movements, now vanished as suddenly as it had come, leaving him with the realization that he had just committed an utterly unmotivated, irrational theft.

He looked around. The old man in black was already striding toward the amphitheater's rim, threading his way between applauding groups. Thorn half-withdrew from his pocket the object he had stolen. It was about two inches in diameter and of a bafflingly gray texture, neither a gem, nor a metal, nor a stone, nor an egg, though faintly suggestive of all four.

It would be easy to run after the man, to say, "You dropped this." But he didn't.

The applause became patchy, erratic, surged up again as members of the orchestra began to emerge from the pit. There was a lot of confused activity in that direction. Shouts and laughter.

A familiar sardonic voice remarked, "Quite a gaudy show they put on. Though perhaps a bit too close for comfort to our business of the evening."

Thorn became aware that Clawly was studying him speculatively. He asked, "Who was that you were talking to?"

Clawly hesitated a moment. "A psychologist I consulted some months back when I had insomnia. You remember."

Thorn nodded vaguely, stood sunk in thought. Clawly prodded him out of it with, "It's late. There are quite a few arrangements to check, and we haven't much time."

Together they started up the hillside.

Especially as a pair, they presented a striking appearance—they were such a study in similarities and contrasts. Certainly they both seemed spiritually akin to some wilder and more troubled age than safe, satisfied, wholesome utopia. Clawly was a small man, but dapper and almost dancingly lithe, with gleamingly alert, subtle features. He might have been some Borgia or Medici from that dark, glittering, twisted core of the Dawn Civilization, when by modern standards mankind was more than half insane. He looked like a small, red-haired, devil-may-care satan, harnessed for good purposes.

Thorn, on the other hand, seemed like a somewhat dishevel and reckless saint, lured by evil. His tall, gaunt frame increased the illusion. He, too, would have fitted into that history-twisted black dawn, perhaps as a Savonarola or da Vinci.

In that age they might have been the bitterest and most vindictive of enemies, but it was obvious that in this they were the most unshakably loyal of friends.

One also sensed that more than friendship linked them. Some secret, shared purpose that demanded the utmost of their abilities and put upon their shoulders crushing responsibilities.

They looked tired. Clawly's features were too nervously mobile, Thorn's eyes too darkly circled, even allowing for the shadows cast by the groundlight, which waned as the false-sky faded, became ragged, showed the stars.

They reached the amphitheater's grassy rim, walked along a row of neatly piled flying togs with distinctive luminescent monograms, spotted their own. Already members of the audience were launching like bats into the summary darkness, filling it with the faint gusty hum of subtronic power, that basic force underlying electric, magnetic, and gravitational phenomena, that titan, potentially earth-destroying power, chained for human use.

As he climbed into his flying togs, Thorn kept looking around. False-sky and groundlight had both dissolved, opening a view to the far horizon, although a little weather, kept electronically at bay for the symchromy, was beginning to drift in—thin streamers of cloud. He felt as never before a poignancy in the beauty of utopia, because he knew as never before how near it might be to disaster, how closely it was pressed upon by alien infinities. There was something spectral about the grandeur of the lonely, softly-glowing skylons, lofty and distant as mountains, thrusting up from the dark rolling countryside. Those vertical, one-building cities of his people, focuses of communal activity, gleaming pegs sparsely studding the whole earth — the Mauve Z peering over the next hill, seeming to top it but actually miles away; beyond it the Gray Twins, linked by a fantastically delicate aerial bridge; off to the left the pearly finger of the Opal Cross; last, farther left, thirty miles away but jutting boldly above the curve of the earth, the mountainous Blue Lorraine—all these majestic skylons seemed to Thorn like the last pinnacles of some fairy city engulfed by a rising black tide.. And the streams of flying men and women, with their softly winking identification lights, no more than fireflies doomed to drown.

His fingers adjusted the last fastening of his togs, paused there. Clawly only said, "Well?" but there was in that one word the sense of a leave-taking from all this beauty and comfort and safety—an ultimate embarkation.

They pulled down their visors. From their feelings, it might have been Mars toward which they launched themselves—a sullen ember halfway up the sky, even now being tentatively probed by the First Interplanetary Expedition. But their actual destination was the Opal Cross.

II.

Never before had the screams of nightmare been such a public problem; now the wise men almost wished they could forbid sleep in the small hours, that the shrieks of cities might less horribly disturb the *pale, pitying moon as it glimmered on green waters.*

Nyarlathotep, H. P. Lovecraft.

Suppressing the fatigue that surged up in him disconcertingly, Clawly rose to address the World Executive Committee. He found it less easy to suppress the feeling that had in part caused the surge of fatigue: the illusion that he was a charlatan seeking to persuade sane men of the truth of fabricated legends of the supernatural. His smile was characteristic of him—friendly, but faintly diabolic, mocking himself as well as others. Then the smile faded.

He summed up, "Well, gentlemen, you've heard the experts. And by now you've guessed why, with the exception of Thorn, they were asked to testify separately. Also, for better or worse — he grimaced grayly—"you've guessed the astounding nature of the danger which Thorn and I believe overhangs the world. You know what we want—the means for continuing our research on a vastly extended and accelerated scale, along with a program of confidential detective investigation throughout the world's citizenry. So nothing remains but to ask your verdict. There are a few points, however, which perhaps will bear stressing."

There was noncommittal silence in the Sky Room of the Opal Cross. It was a huge chamber and seemed no less huge because the ceiling was at present opaque—a great gray span arching from the World Map on the south wall to the Space Map on the north. Yet the few men gathered in an uneven horseshoe of armchairs near the center in no way suggested political leaders seeking a prestige-enhancing background for their deliberations, but rather a group of ordinary men who for various practical reasons had chosen to meet in a ballroom. Any other group than the World Executive Committee might just as well have reserved the Sky Room. Indeed, others had danced here earlier this night, as was mutely testified by a scattering of lost gloves, scarves, and slippers, along with half-emptied glasses and other flotsam of gaiety.

Yet in the faces of the gathered few there was apparent a wisdom and a penetrating understanding and a leisurely efficiency in action that it would have been hard to find the equal of, in any similar group in earlier times. And a good thing, thought Clawly, for what he was trying to convince them of was something not calculated to appeal to the intelligence of practical administrators—it was doubtful if any earlier culture would have granted him and Thorn any hearing at all.

He surveyed the faces unobtrusively, his dark glance flitting like a shadow, and was relieved to note that only in Conjerly's and perhaps Tempelmar's was a completely unfavorable reaction apparent. Firemoor, on the contrary, registered feverish and unquestioning belief, but that was to be expected in the volatile, easily-swayed chief of the Extraterrestrial Service—and a man who was Clawly's admiring friend. Firemoor was alone in this open expression of credulity. Chairman Shielding, whose opinion mattered most, looked on the whole skeptical and perhaps a shade disapproving; though that, fortunately, was the heavy-set man's normal expression.

The rest, reserving judgment, were watchful and attentive. With the unexpected exception of Thorn, who seemed scarcely to be listening, lost in some strange fatigued abstraction since he had finished making his report.

A still-wavering audience, Clawly decided. What he said now, and how he said it, would count heavily.

He touched a small box. Instantly some tens of thousands of pinpricks of green light twinkled from the World Map.

He said, "The nightmare-frequency for an average night a hundred years ago, as extrapolated from random samplings. Each dot —a bad dream. A dream bad enough to make the dreamer wake in fright."

Again he touched the box. The twinkling pattern changed slightly —there were different clusterings— but the total number of pinpricks seemed not to change.

"The same, for fifty years ago," he said. "Next—forty." Again there was merely a slight alteration in the grouping.

"And now—thirty." This time the total number of pinpricks seemed slightly to increase.

Clawly paused. He said, "I'd like to remind you, gentlemen, that Thorn proved conclusively that his method of sampling was not responsible for any changes in the frequency. He met all the objections you raised—that his subjects were reporting their dreams more fully, that he wasn't switching subjects often enough to avoid cultivating a nightmare-dreaming tendency, and so on."

Once more his hand moved toward the box. "Twenty-five." This time there was no arguing about the increase.

"Twenty."

"Fifteen."

"Ten."

"Five."

Each time the total greenness jumped, until now it was a general glow emanating from all the continental areas. Only the seas still showed widely scattered points, where men dreamed in supra- or sub-surface craft, and a few heavy clusters, where ocean-based skylons rose through the waves.

"And now, gentlemen, the present."

The evil radiance swamped the continents, reached out and touched the faces of the armchair observers.

"There you have it, gentlemen. A restful night in utopia," said Clawly quietly. The green glow unwholesomely emphasized his tired pallor and the creases of strain around eyes and mouth. He went on, "Of course it's obvious that if nightmares are as common as all that, you and yours can hardly have escaped. Each of you knows the answer to that question. As for myself — my nightly experiences provide one more small confirmation of Thorn's report."

He switched off the map. The carefully noncommital faces turned back to him.

Clawly noted that the faint, creeping dawn-line on the World Map was hardly two hours away from the Opal Cross. He said, "I pass over the corroborating evidence—the slight steady decrease in average sleeping time, the increase in day sleeping and nocturnal social activity, the unprecedented growth of art and fiction dealing with supernatural terror, and so on—in order to emphasize as strongly as possible Thorn's secondary discovery: the similarity between the nightmare landscapes of his dreamers. A similarity so astonishing that, to me, the wonder is that it wasn't noticed sooner, though of course Thorn wasn't looking for it and he tells me that most of his earlier subjects were unable, or disinclined, to describe in detail the landscapes of their nightmares." He looked around. "Frankly, that similarity is unbelievable. I don't think even Thorn did full justice to it in the time he had for his report—you'd have to visit his offices, see his charts and dream-sketches, inspect his monumental tables of correlation. Think: hundreds of dreamers, to take only Thorn's samples, thousands of miles apart, and all of them dreaming—not the *same* nightmare, which might be explained by assumig telepathy or some subtle form of mass suggestion—but nightmares with the same landscape, the same general landscape. As if each dreamer were looking through a different window at a consistently distorted version of our own world. A dream world so real that when I recently suggested to Thorn he try to make a map of it, he did *not* dismiss my notion as nonsensical."

The absence of a stir among his listeners was more impressive than any stir could have been. Clawly noted that Conjerly's frown had deepened, become almost angry. He seemed about to speak, when Tempelmar casually forestalled him.

"I don't think telepathy can be counted out as an explanation," said the tall, long-featured, sleepy-eyed man. "It's still a purely hypothetic field—we don't know how it would operate. And there may have been contacts between Thorn's subjects that he didn't know about. They may have told each other their nightmares and so started a train of suggestion."

"I don't believe so," said Clawly slowly. "His precautions were thorough. Moreover, it wouldn't fit with the reluctance of the dreamers to describe their nightmares."

"Also," Tempelmar continued, "we still aren't a step nearer the underlying cause of the phenomenon. It might be anything—for instance, some unpredictable physiological effect of subtronic power, since it came into use about thirty years ago."

"Precisely," said Clawly. "And so for the present we'll leave it at that—vastly more frequent nightmares with strangely similar landscapes, cause unknown—while I"—he again gaged the position of the dawn line—"while I hurry on to those matters which I consider the core of our case: the incidence of cryptic amnesia and delusions of nonrecognition. The latter first."

Again Conjerly seemed about to interrupt, and again something stopped him. Clawly got the impression it was a slight deterring movement from Tempelmar.

He touched the box. Some hundreds of yellow dots appeared on the World Map, a considerable portion of them in close clusters of two and three.

He said, "This time, remember, we can't go back any fifty years. These are such recent matters that there wasn't any hint of them even in last year's Report on the Psychological State of the World. As the experts agreed, we are dealing with an entirely new kind of mental disturbance. At least, no cases can be established prior to the last two years, which is the period covered by this projection."

He looked toward the map. "Each yellow dot is a case of delusions of nonrecognition. An otherwise normal individual fails to recognize a family member or friend, maintains in the face of all evidence that he is an alien and impostor — a frequent accusation, quite baseless, is that his place has been taken by an unknown identical twin. This delusion persists, attended by emotional disturbances of such magnitude that the sufferer seeks the services of a psychiatrist —in those cases we *know* about. With the psychiatrist's assistance, one of two adjustments is achieved: the delusions fade and the avowed alien is accepted as the true individual, or they persist and there is a separation—where husband and wife are involved, a divorce. In either case, the sufferer recovers completely.

"And now—cryptic amnesia. For a reason that will soon become apparent, I'll first switch off the other projection."

The yellow dots vanished, and in their place glowed a somewhat smaller number of violet pinpoints. These showed no tendency to form clusters.

"It is called cryptic, I'll remind you, because the victim makes a very determined and intelligently executed effort to conceal his memory lapse—frequently shutting himself up for several days on some pretext and feverishly studying all materials and documents relating to himself he can lay hands on. Undoubtedly sometimes he succeeds. The cases we hear about are those in which he makes such major slips —as being mistaken as to what his business is, who he is married to, who his friends are, what is going on in the world—that he is forced, agains this will, to go to a psychiatrist. Whereupon, realizing that his efforts have failed, he generally confesses his amnesia, but is unable to offer any information as to its cause, or any convincing explanation of his attempt at concealment. Thereafter, readjustment is rapid."

He looked around. "And now,

gentlemen, a matter which the experts didn't bring out, because I arranged it that way. I have saved it in order to impress it upon your minds as forcibly as possible—the correlation between cryptic amnesia and delusions of nonrecognition."

He paused with his hand near the box, aware that there was something of the conjurer about his movements and trying to minimize it. "I'm going to switch on both projections at once. Where cases of cryptic amnesia and delusions of nonrecognition coincide — I mean, where it is the cryptic amnesiac about whom the other person or persons had delusions of nonrecognition—the dots will likewise coincide; and you know what happens when violet and yellow light mix. I'll remind you that in ordinary cases of amnesia there are no delusions of nonrecognition — family and friends are aware of the victim's memory lapse, but they do not mistake him for a stranger."

His hand moved. Except for a sprinkling of yellow, the dots that glowed on the map were pure white.

"Complementary colors," said Clawly quietly. "The yellow has blanked out all the violet. In some cases one violet has accounted for a cluster of yellows—where more than one individual had delusions of nonrecognition about the same cryptic amnesiac. Except for the surplus cases of nonrecognition—which almost certainly correspond to cases of successfully concealed cryptic amnesia—the nonrecognitions and cryptic amnesias are shown to me dual manifestations of a single underlying phenomenon."

He paused. The tension in the Sky Room deepened. He leaned forward. "It is that underlying phenomenon, gentlemen, which I believe constitutes a threat to the security of the world, and demands the most immediate and thoroughgoing investigation. Though staggering, the implications are obvious."

•

The tautness continued, but slowly Conjerly got to his feet. His compact, stubby frame, bald bullethead, and uncompromisingly impassive features were in striking contrast with Clawly's mobile, half-haggard, debonair visage.

Leashed anger deepened Conjerly's voice, enhanced its authority.

"We have come a long way from the Dawn Era, gentlemen. One might think we would never again have to grapple with civilization's old enemy superstition. But I am forced to that regretful conclusion when I hear this gentleman, to whom we have granted the privilege of an audience, advancing theories of demoniac possession to explain cases of amnesia and nonrecognition." He looked at Clawly. "Unless I wholly misunderstood?"

Clawly decisively shook his head. "You didn't. It is my contention—I might as well put it in plain words—that alien minds are displacing the minds of our citizens, that they are infiltering Earth, seeking to gain a foothold here. As to what minds they are, where they come from—I can't answer that, except to remind you that Thorn's studies of dream landscapes hint at a world strangely like our own, though strangely distorted. But the secrecy of the invaders implies that their purpose is hostile—at best, suspect. And I need not remind you that, in this age of subtronic power, the presence of even a tiny hostile group could become a threat to Earth's very existence."

Slowly Conjerly clenched his stub fingers, unclenched them. When he spoke, it was as if he were reciting a creed.

"Materialism is our bedrock, gentlemen—the firm belief that every phenomenon must have a real existence and a real cause. It has made possible science technology, unbiased self-understanding. I am open-minded. I will go as far as any in granting a hearing to new theories. But when those theories are a revival of the oldest and most ignorant superstitions, when this gentleman seeks to frighten us with

nightmares and tales of evil spirits stealing human bodies, when he asks us on this evidence to institute a gigantic witch-hunt, when he raises the old bogey of subtronic power breaking loose, when he brings in a colleague"—he glared at Thorn—"who takes seriously to the idea of surveying dream worlds with transit and theodolite—then I say, gentlemen, that if we yield to such suggestions, we might as well throw materialism overboard and, as for safeguarding the future of mankind, ask the advice of fortune-tellers!"

At the last word Clawly started, recovered himself. He dared not look around to see if anyone had noticed.

The anger in Conjerly's voice strained at its leash, threatened to break it.

"I presume, sir, that your confidential investigators will go out with wolfsbane to test for werewolves, garlic to uncover vampires, and cross and holy water to exorcise demons!"

"They will go out with nothing but open minds," Clawly answered quietly.

Conjerly breathed deeply, his face reddened slightly, he squared himself for a fresh and more uncompromising assault. But just at that moment Tempelmar eased himself out of his chair. As if by accident, his elbow brushed Conjerly's.

"No need to quarrel," Tempelmar drawled pleasantly, "though our visitor's suggestions do sound rather peculiar to minds tempered to a realistic materialism. Nevertheless, it is our duty to safeguard the world from any real dangers, no matter how improbable or remote. So, considering the evidence, we must not pass lightly over our visitor's theory that alien minds are usurping those of Earth—at least not until there has been an opportunity to advance alternate theories."

"Alternate theories *have* been advanced, tested, and discarded," said Clawly sharply.

"Of course," Tempelmar agreed smilingly. "But in science that's a process that never quite ends, isn't it?"

He sat down, Conjerly following suit as if drawn. Clawly was irascibly conscious of having got the worst of the interchange—and the lanky, sleepy-eyed Tempelmar's quiet skepticism had been more damaging than Conjerly's blunt opposition, though both had told. He felt, emanating from the two of them, a weight of personal hostility that bothered and oppressed him. For a moment they seemed like utter strangers.

He was conscious of standing too much alone. In every face he could suddenly see skepticism. Shielding was the worst—his expression had become that of a man who suddenly sees through the tricks of a sleight-of-hand artist masquerading as a true magician. And Thorn, who should have been mentally at his side, lending him support, was sunk in some strange reverie.

He realized that even in his own

mind there was a growing doubt of the things he was saying.

Then, utterly unexpectedly, adding immeasurably to his dismay, Thorn got up, and without even a muttered excuse to the men beside him, left the room. He moved a little stiffly, like a sleepwalker. Several glanced after him curiously. Conjerly nodded. Tempelmar smiled.

Clawly noted it. He rallied himself. He said, "Well, gentlemen?"

III.

But who will reveal to our waking ken
The forms that swim and the shapes that creep
Under the waters of sleep?
The Marshes of Glynn, Sidney Lanier.

Like a dreamer who falls headforemost for giddy miles and then is wafted to a stop as gently as a leaf, Thorn plunged down the main vertical levitator of the Opal Cross and swam out of it at ground level, before its descent into the half mile of basements. At this hour the great gravity-less tube was relatively empty, except for the ceaseless silent plunge and ascent of the graduated subtronic currents and the air they swept along. There were a few other down-and-up swimmers—distant leaflike swirls of color afloat in the contracting white perspective of the tube—but, like a dreamer, Thorn did not seem to take note of them.

Another levitating current carried him along some hundred yards of mural-faced corridor to one of the pedestrian entrances of the Opal Cross. A group of revelers stopped their crazy, squealing dance in the current to watch him. They looked like figures swum out of the potently realistic murals—but with a more hectic, troubled gaiety on their faces. There was something about the way he plunged past them unseeing, his sleepwalker's eyes fixed on something a dozen yards ahead, that awakened unpleasant personal thoughts and spoiled their feverish fun-making.

The pedestrian entrance was really a city-limits. Here the one-building metropolis ended, and there began the horizontal miles of half-wild countryside, dark as the ancient past, trackless and roadless in the main, dotted in many areas with small private dwellings, but liberally brushed with forests.

A pair of lovers on the terrace, pausing for a kiss as they adjusted their flying togs, broke off to look curiously after Thorn as he hurried down the ramp and across the close-cropped lawn, following one of the palely-glowing pathways. The up-slanting pathlight, throwing into gaunt relief his angular cheekbones and chin, made him resemble some ancient pilgrim or crusader in the grip of a religious complusion.

Then the forest had swallowed him up.

A strange mixture of trance and willfullness, of dream and waking, of aimless wandering and purposeful tramping, gripped Thorn as he adventured down that black-fringed ghost-trail. Odd memories of child-

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hood, of old hopes and desires, of student days with Clawly, of his work and the bewildering speculations it had led to, drifted across his mind, poignant but meaningless. Among these, but drained of significance, like the background of a dream, there was a lingering picture of the scene he had left behind him in the Sky Room. He was conscious of somehow having deserted a friend, abandoned a world, betrayed a great purpose—but it was a blurred consciousness and he had forgotten what the great purpose was.

Nothing seemed to matter any longer but the impulse pulling him forward, the sense of an unknown but definite destination.

He had the feeling that if he looked long enough at that receding, beckoning point a dozen yards ahead, something would grow there.

The forest path was narrow and twisting. Its faint glow silhouetted weeds and brambles partly overgrowing it. His hands pushed aside encroaching twigs.

He felt something tugging at his mind from ahead, as if there were other avenues leading to his subconscious than that which went through his consciousness. As if his subconscious were the core of two or more minds, of which his was the only one.

Under the influence of that tugging, imagination awoke.

Instantly it began to recreate the world of his nightmares. The world which had obscurely dominated his life and turned him to dream-research, where he had found similar nightmares. The world where danger lay. The blue-litten world in which a mushroom growth of ugly squat buildings, like the factories and tenements and barracks of ancient times, blotched the utopian countryside, and along whose sluice-like avenues great crowds of people ceaselessly drifted, unhappy but unable to rest—among them that other, dream Thorn, who hated and envied him, deluged him with an almost unbearable sense of guilt.

For almost as long as he could remember, that dream Thorn had tainted his life—the specter at his feasts, the suppliant at his gates, the eternal accuser in the courts of inmost thought—drifting phantomwise across his days, rising up starkly real and terrible in his nights. During the long, busy holiday of youth, when every day had been a new adventure and every thought a revelation, that dream Thorn had been painfully discovering the meaning of oppression and fear, had been security swept away and parents exiled, had attended schools in which knowledge was forbidden and all a man learned was his place. When he was discovering happiness and love, that dream Thorn had been rebelliously grieving for a young wife snatched away from him forever because of some autocratic government's arbitrary decrees. And while he was accomplishing his life's work, building new knowledge stone by stone, that dream Thorn had toiled monotonously at meaningless jobs, slunk away to brood and plot with others of his kind, been harried by a fiendishly efficient secret police, become a hater and a killer.

Day by day, month by month, year by year, the dark-stranded dream life had paralleled his own.

He knew the other Thorn's emotions almost better than his own, but the actual conditions and specific details of the dream Thorn's life were blurred and confused in a characteristically dreamlike fashion. It was as if he were dreaming that other Thorn's dreams—while, by some devilish exchange, that other Thorn dreamed his dreams and hated him for his good fortune.

A sense of guilt toward his dream-twin was the dominant fact in Thorn's inner life.

And now, pushing through the forest, he began to fancy that he could see something at the receding focus of his vision a dozen yards ahead, something that kept flickering and fading, so that he could scarely be sure that he saw it, and that yet seemed an embodiment of all the unseen forces dragging him along—a pale, wraithlike face, horribly like his own.

The sense of a destination grew stronger and more urgent. The mile wall of the Opal Cross, a pale cataract of stone glimpsed now and then through overhanging branches, still seemed to rise almost at his heels, creating the maddening illusion that he was making no progress. The wraith-face blacked out. He began to run.

Twigs lashed him. A root caught at his foot. He stumbled, checked himself, and went on more slowly, relieved to find that he could at least govern the rate of his progress.

The forces tugging at him were both like and infinitely unlike those which had for a moment controlled his movements at the symchromy. Whereas those had seemed to have a wholly alien source, these seemed to have come from a single human mind.

He felt in his pocket for the object he had stolen from Clawly's mysterious confidant. He could not see much of its color now, but that made its baffling texture stand out. It seemed to have a little more inertia than its weight would account for. He was certain he had never touched anything quite like it before.

He couldn't say where the notion came from, but he suddenly found himself wondering if the thing could be a single molecule. Fantastic! And yet, was there anything to absolutely prevent atoms from assembling, or being assembled, in such a giant structure?

Such a molecule would have more atoms that the universe had suns.

Oversize molecules were the keys of life—the hormones, the activators, the carriers of heredity. What doors might not a supergiant molecule unlock?

The merest fancy—yet frightening. He started to throw the thing away, but instead tucked it back in his pocket.

There was a rush in the leaves. A large cat paused for an instant in the pathlight to snarl and stare at him. Such cats were common pets, for centuries bred for intelligence and for centuries tame. Yet now, on the prowl, it seemed all wild—with an added, evil insight gained from long association with man.

The path branched. He took a sharp turn, picking his way over bulbous roots. The pathlight grew dim and diffuse, its substance dissolved and spread by erosion. At places the vegetation had absorbed some of the luminescence. Leaves and stems glowed faintly.

But beyond, on either side, the forest was a black, choked infinity.

It had come inscrutably alive.

The sense of a thousand infinities pressing upon him, experienced briefly at the Yggdrasil, now returned with redoubled force.

The Yggdrasil was true. Reality was not what it seemed on the surface. It had many roots, some strong and true, some twisted and gnarled, nourished in many worlds.

He quickened his pace. Again something seemed to be growing at the focus of his vision—a flitting, pulsating, bluish glow. It was like the Yggdrasil's Nidhogg motif. Nidhogg, the worm gnawing ceaselessly at the root of the tree of life that goes down to hell. It droned against his vision—an unshakable color-tune.

Then, gradually, it became a face. His own face, but seared by unfamiliar emotions, haggard with unknown miseries, hard, vengeful, accusing—the face of the dream Thorn, beckoning, commanding, luring him toward some unknown destination in the maze of unknown, unseen worlds.

With a sob of courage and fear, he plunged toward it.

He must come to grips with that other Thorn, settle accounts with him, even the balance of pleasure and pain between them, right the wrong of their unequal lives. For in some sense he must *be* that other Thorn, and that other Thorn must be he. And a man could not be untrue to himself.

The wraithlike face receded as swiftly as he advanced.

His progress through the forest became a nightmarish running of the gauntlet, through a double row of giant black trees that slashed him with their branches.

The face kept always a few yards ahead.

Fear came, but too late—he could not stop.

The dreamy veils that had been drawn across his thoughts and memories during the first stages of his flight from the Opal Cross, were torn away. He realized that what was happening to him was the same thing that had happened to hundreds of other individuals. He realized that an alien mind was displacing his own, that another invader and potential cryptic amnesiac was gaining a foothold on Earth.

The thought hit him hard that he was deserting Clawly, leaving the whole world in the lurch.

But he was only a will-less thing that ran with outclutched hands.

Once he crossed a bare hilltop and for a moment caught a glimpse of the lonely glowing skylons—the

Blue Lorraine, the Gray Twins, the Myrtle Y — but distant beyond reach, like a farewell.

He was near the end of his strength.

The sense of a destination grew overpoweringly strong.

Now it was something just around the next turn in the path.

He plunged through a giddy stretch of darkness thick as ink—and came to a desperate halt, digging in his heels, flailing his arms.

From somewhere, perhaps from deep within his own mind, came a faint echo of mocking laughter.

IV.

If you can look into the seeds of
time,
And say which grain will grow and
and which will not—
Macbeth

Like a mote in the grip of an intangible whirlwind, Clawly whipped through the gray dawn on a steady surge of subtronic power toward the upper levels of the Blue Lorraine. The brighter stars, and Mars, were winking out. Through the visor of his flying togs the rushing air sent a chill to which his blood could not quite respond. He should be home, recuperating from defeat, planning new lines of attack. He should be letting fatigue poisons drain normally from his plasma, instead of knocking them out with stimulol. He should be giving his thoughts a chance to unwind. Or he should have given way to lurking apprehensions and be making a frantic search for Thorn. But the itch of a larger worry was upon him, and until he had done a certain thing, he could not pursue personal interests, or rest.

With Thorn gone, his rebuff in the Sky Room loomed as a black and paralyzingly insurmountable obstacle that grew momently higher. They were lucky, he told himself, not to have had their present research funds curtailed—let alone having them increased, or being given a large staff or assistants, or being granted access to the closely guarded files of confidential information on cryptic amnesiacs and other citizens. Any earlier culture would probably have forbidden their research entirely, as a menace to the mental stability of the public. Only an almost fetishlike reverence for individual liberty and the inviolability of personal pursuits, had saved them.

The Committee's adverse decision had even shaken his own beliefs. He felt himself a puny little man, beset by uncertainties and doubts, quite incompetent to protect the world from dangers as shadowy, vast, and inscrutable as the gloom-drenched woodlands a mile below.

Why the devil had Thorn left the meeting like that, of necessity creating a bad impression? Surely he couldn't have given way to any luring hypnotic impulse—he of all men ought to know the danger of that. Still, there had been that unpleasant suggestion of sleepwalking in his departure — an impression that Clawly's memory kept magnifying. And Thorn was a strange fellow.

After all these years, Clawly still found him unpredictable. Thorn had a spiritual recklessness, an urge to plumb all mental deeps. And God knows there were deeps enough for plumbing these days, if one were foolish. Clawly felt them in himself—the faint touch of a darker, less pleasant version of his own personality, against which he must keep constantly on guard.

If he had let something happen to Thorn—!

A variation in the terrestrial magnetic field, not responded to soon enough, sent him spinning sideways a dozen yards, forced his attention back on his trip.

He wondered if he had managed to slip away as unobtrusively as he had thought. A few of the committee members had wanted to talk. Firemoor, who had voted against the others and supported Clawly's views rather too excitedly, had been particularly insistent. But he had managed to put them off. Still, what if he were followed? Surely Conjerly's reference to "fortune-tellers" had been mere chance, although it had given him a nasty turn. But if Conjerly and Tempelmar should find out where he was going now— What a handle that would give them against him!

It would be wiser to drop the whole business, at least for a time.

No use. The vice of the thing—if vice it be—was in his blood. The Blue Lorraine drew him as a magnet flicks up a grain of iron.

A host of images fought for possession of his tired mind, as he plunged through thin streamers of paling cloud. Green dots on the World Map. The greens and blues of the Yggdrasil—and in what nightmare worlds had Hoderson found his inspiration? The blue-tinted sketches one of Thorn's dreamers had made of the world of his nightmares. A sallow image of Thorn's face altered and drawn by pain, such an image as might float into the mind of one who watches too long by a sickbed. The looks on the faces of Conjerly and Tempelmar—that fleeting impression of a hostile strangeness. The hint of a dark alien presence in the depths of his own mind.

The Blue Lorraine grew gigantic, loomed as a vast, shadow-girt cliff, its topmost pinnacles white with frost although the night below had been summery. There were already signs of a new day beginning. Here and there freighters clung like beetles to the wall, discharging or receiving cargo through unseen ports. Some distance below a stream of foodstuffs for the great dining halls, partly packaged, partly not, was coming in on a subtronic current. Off to one side an attendant shepherded a small swarm of arriving schoolchildren, although it was too early yet for the big crowds.

Clawly swooped to a landing stage, hovered for a moment like a bird, then dropped. In the anteroom he and another early arriver helped each other remove and check their flying togs.

He was breathing hard, there was a deafness and a ringing in his ears, he rubbed his chilled fingers. He should not have made such a steep and swift ascent. It would have been easier to land at a lower stage and come up by levitator. But this way was more satisfying to his impatience. And there was less chance of someone following him unseen.

A levitating current wafted him down a quarter mile of mainstem corridor to the district of the psychologists. From there he walked.

He looked around uneasily. Only now did real doubt hit him. What if Conjerly were right? What if he were merely dragging up ancient superstitions, foisting them on a group of overspecialized experts, Thorn included? What if the world-threat he had tried to sell to the World Executive Committee were just so much morbid nonsense, elaborately bastioned by a vast array of misinterpreted evidence? What if the darker, crueler, deviltry-loving side of his mind were more in control than he realized? He felt uncomfortably like a charlatan, a mountebank trying to pipe the whole world down a sinister side street, a chaos-loving jester seeking to perpetrate a vast and unpleasant hoax. It was all such a crazy business, with origins far more dubious than he had dared reveal even to Thorn, from whom he had no other secrets. Best back down now, at least quit stirring up any more dark currents.

But the other urge was irresistible. There were things he had to know, no matter the way of knowing.

Stealing himself, he paraphrased Conjerly. "If the evidence seems to point that way, if the safety of mankind seems to demand it, then I *will* throw materialism overboard and ask the advice of fortunetellers!"

He stopped. A door faced him. Abruptly it was a doorway. He went in, approached the desk and the motionless, black-robed figure behind it.

As always, there was in Oktav's face that overpowering suggestion of age—age far greater than could be accounted for by filmy white hair, sunken cheeks, skin tight-drawn and wrinkle-etched. Unwilled, Clawly's thoughts turned toward the Dawn Civilization with its knights in armor and aircraft winged like birds, its whispered tales of elixirs of eternal life—and toward that oddly long-lived superstition, rumor, hallucination, that men clad in the antique garments of the Late Middle Dawn Civilization occasionally appeared on Earth for brief periods at remote places.

Oktav's garb, at any rate, was just an ordinary houserobe. But in their wrinkle-meshed orbits, his eyes seemed to burn with the hopes and fears and sorrows of centuries. They took no note of Clawly as he edged into a chair.

"I see suspense and controversy," intoned the seer abruptly. "All night it has surged around you. It regards that matter whereof we spoke at the Yggdrasil. I see others doubting and you seeking to persuade them. I see two in particular in grim opposition to you, but I cannot see their minds or

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motives. I see you in the end losing your grip, partly because of a friend's seeming desertion, and going down in defeat."

Of course, thought Clawly, he could learn all this by fairly simple spying. Still, it impressed him, as it always had since he first chanced—But was it wholly chance?—to contact Oktav in the guise of an ordinary psychologist.

Not looking at the seer, with a shyness he showed toward no one else, Clawly asked, "What about the world's future? Do you see anything more there?"

There was a faint drumming in the seer's voice. "Only thickening dreams, more alien spirits stalking the world in human mask, doom overhanging, great claws readying to pounce—but whence or when I cannot tell, only that your recent effort to convince others of the danger has brought the danger closer."

Clawly shivered. Then he sat straighter. He was no longer shy. Docketing the question about Thorn that was pushing at his lips, he said, "Look, Oktav, I've got to know more. It's obvious that you're hiding things from me. If I map the best course I can from the hints you give me, and then you tell me that it is the wrong course, you tie my hands. For the good of mankind, you've got to describe the overhanging danger more definitely."

"And bring down upon us forces that will destroy us both?" The seer's eyes stabbed at him. "There are worlds within worlds, wheels within wheels. Already I have told you too much for our safety. Moreover, there are things I honestly do not know, things hidden even from the Great Experimenters—and my guesses might be worse than yours."

Taut with a sense of feverish unreality, Clawly's mind wandered. What was Oktav—what lay behind that ancient mask? Were all faces only masks? What lay behind Conjerly's and Tempelmar's? Thorn's? His own? Could your own mind be a mask, too, hiding things from your own consciousness? What was the world—this brief masquerade of inexplicable events, flaring up from the future to be instantly extinguished in the past?

"But then what am I to do, Oktav?" he heard his tired voice ask.

The seer replied, "I have told you before. Prepare your world for any eventuality. Arm it. Mobilize it. Do not let it wait supine for the hunter."

"But how can I, Oktav? My request for a mere program of investigation was balked. How can I ask the world to arm—for no reason?"

The seer paused. When he finally answered there drummed in his voice, stronger than ever, the bitter wisdom of centuries.

"Then you must give it a reason. Always governments have provided appropriate motives for action, when the real motives would be unpalatable to the many, or beyond their belief. You must extemporize a danger that fits the trend of their short-range thinking. Now let me see— Mars—"

There was a slight sound. The seer wheeled around with a serpentine rapidity, one skinny hand plunged in the breast of his robe. It fumbled wildly, agitating the black, weightless fabric, then came out empty. A look of extreme consternation contorted his features.

Clawly's eyes shifted with his to the inner doorway.

The figure stayed there peering at Oktav for only a moment. Then, with an impatient, peremptory flirt of its head, it turned and moved out of sight. But it was indelibly etched, down to the very last detail, on Clawly's panic-shaken vision.

Most immediately frightening was the impression of age—age greater than Oktav's, although, or perhaps because, the man's physical appearance was that of thirty-odd, with dark hair, low forehead, vigorous jaw. But in the eyes, in the general expression—centuries of knowledge. Yet knowledge without wisdom, or with only a narrow-minded, puritanic, unsympathetic, overweening simulacrum of wisdom. A disturbing blend of unconscious ignorance and consciousness of power. The animal man turned god, without transfiguration.

But the most lingering impression, oddly repellent, was of its clothing. Crampingly unweildly upper and nether garments of tight-woven, compressed, tortured animal-hair, fastened by bits of bone or horn. The upper garment had an underduplicate of some sort of bleached vegetable fiber, confined at the throat by two devices—one a tightly knotted scarf of crudely woven and colored insect spinnings, the other a high and unyielding white neckband, either of the same fiber as the shirt, glazed and stiffened, or some primitive plastic.

It gave Clawly an added, anti-climactic start to realize that the clothing of the nineteenth and twentieth centuries, which he had seen pictured in history albums, would have just this appearance, if actually prepared according to the ancient processes and worn by a human being.

Without explanation, Oktav rose and moved toward the inner doorway. His hand fumbled again in his robe, but it was merely an idle repetition of the earlier gesture. In the last glimpse he had of his face, Clawly saw continued consternation, frantic memory-searching, and the frozen intentness of a competent mind scanning every possible avenue of escape from a deadly trap.

Oktav went through the doorway.

There was no sound.

Clawly waited.

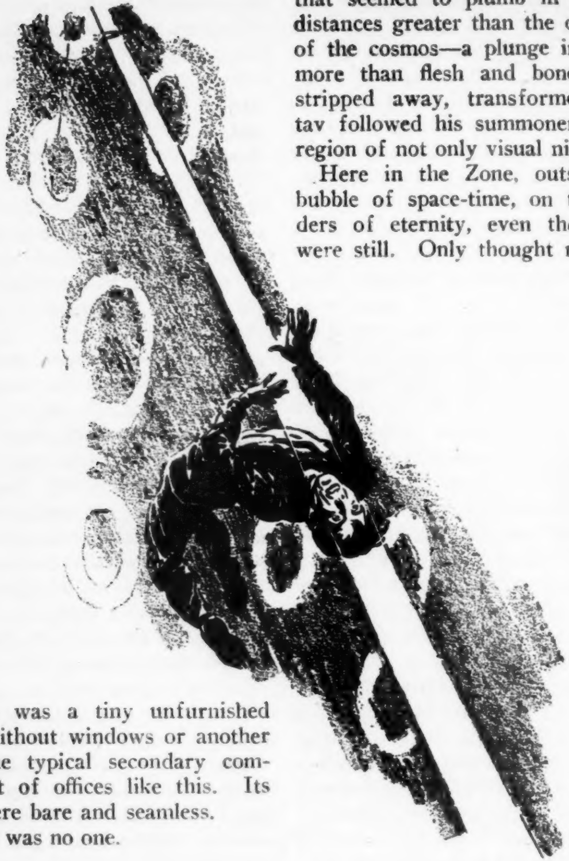
Time spun on. Clawly shifted his position, caught himself, coughed, waited, coughed again, got up, moved toward the inner doorway, came back and sat down.

There was time, too much time. Time to think again and again of that odd superstition about fleeting appearances of men in Dawn-Civilization garb. Time to make a thousand nightmarish deductions from the age in Oktav's, and that other's, eyes.

Finally he got up and walked to the inner doorway.

With a sickening ultimate plunge, that seemed to plumb in instants distances greater than the diameter of the cosmos—a plunge in which more than flesh and bones were stripped away, transformed—Oktav followed his summoner into a region of not only visual night.

Here in the Zone, outside the bubble of space-time, on the borders of eternity, even the atoms were still. Only thought moved—



There was a tiny unfurnished room, without windows or another door, the typical secondary compartment of offices like this. Its walls were bare and seamless.

There was no one.

V.

. . . and still remoter spaces where only a stirring in vague blacknesses had told of the presence of consciousness and will.

The Hunter of the Dark
Howard Phillips Lovecraft.

but thought powered beyond description or belief, thought that could make or mar universes, thought not unbefitting gods.

Most strange, then, to realize that it was human thought, with all its homely biases and foibles. Like finding, on another planet in another universe, a peasant's cottage with smoke wreathing above the thatched roof and an axe wedged in a half-chopped log.

Mice scurrying at midnight in a vast cathedral—and the faint suggestion that the cathedral might not be otherwise wholly empty.

Oktav, or that which had been Oktav, oriented itself—himself—making use of the sole means of perception that functioned in the Zone. It was most akin to touch, but touch strangely extended and sensitive only to projected thought or processes akin to thought.

Groping like a man shut in an infinite closet, Oktav felt the eternal hum of the Probability Engine, the lesser hum of the seven unlocked talismans. He felt the seven human minds in their stations around the engine, felt six of them stiffen with cold disapproval as Ters made report. Then he took his own station, the last and eighth.

Ters concluded.

Prim thought, "We summoned you, Oktav, to hear your explanation of certain highly questionable activities in which you have recently indulged—only to learn that you have additionally committed an act of unprecedented negligence. Never before has a talisman been lost. And only twice has it been necessary to make an expedition to recover one—when its possessor met accidental death in a space-time world. How can you have permitted this to happen, since a talisman gives infallible warning if it is in any way spacially or temporarily parted from its owner?"

"I am myself deeply puzzled," Oktav admitted. "Some obscure influence must have been operative, inhibiting the warning or closing my mind to it. I did not become aware of the loss until I was summoned. However, casting my mind back across the last Earth-day's events, I believe I can now discern the identity of the individual into whose hands it fell—or who stole it."

"Was the talisman inert at the time?" thought Prim quickly.

"Yes," thought Oktav. "A Key-idea known only to myself would be necessary to unlock its powers."

"That is one small point in your favor," thought Prim.

"I am gravely at fault," thought Oktav, "but it can easily be mended. Lend me another talisman and I will return to the world and recover it."

"It will not be permitted," thought Prim. "You have already spent too much time in the world, Oktav. Although you are the youngest of us, your body is senile."

Before he could check himself, or at least avoid projection, Oktav thought, "Yes, and by so doing I have learned much that you, in your snug retreat, would do well to become aware of."

"The world and its emotions have corrupted you," thought Prim.

"And that brings me to the second and major point of our complaint."

Oktav felt the seven minds converge hostilely upon him. Careful to mask his ideational processes, Oktav probed the others for possible sympathy or weakness. Lack of a talisman put him at a great disadvantage. His hopes fell.

Prim thought, "It has come to our attention that you have been telling secrets. Moved by some corrupt emotionality, and under the astounding primitive guise of fortunetelling, you have been disbursing forbidden knowledge—cloudily perhaps, but none the less unequivocally—to earthlings of the main-trunk world."

"I do not deny it," thought Oktav, crossing his Rubicon. "The main-trunk world *needs* to know more. It has been your spoiled brat. And as often happens to a spoiled brat, you now push it, unprepared and unaided, into a dubious future."

Prim's answering thought, amplified by his talisman, thundered in the measureless dark. "*We* are the best judges of what is good for the world. Our minds are dedicated far more selflessly than yours to the world's welfare, and we have chosen the only sound scientific method for insuring its continued and ultimate happiness. One of the unalterable conditions of that method is that no Earthling have the slightest concrete hint of our activities. Has your mind departed so far from scientific clarity — influenced perhaps by bodily decay due to injudicious exposure to space-time—that I must recount to you our purpose and our rules?"

The darkness pulsed. Oktav projected no answering thought. Prim continued, thinking in a careful step-by-step way, as if for a child.

"No scientific experiment is possible without controls—set-ups in which the conditions are unaltered, as a comparison, in order to gauge the exact effects of the alteration. There is, under natural conditions, only one world. Hence no experiments can be performed upon it. One can never test scientifically which form of social organization, government, and so forth, is best for it. But the creation of alternate worlds by the Probability Engine changes all that."

Prim's thought beat at Oktav.

"Can it be that the underlying logic of our procedure has somehow always escaped you? From our vantage point we observe the world as it rides into the cone of the future—a cone that always narrows towards the present, because in the femote future there are many major possibilities still realizable, in the near future only a relative few. We note the approach of crucial epochs, when the world must make some great choice, as between democracy and totalitarianism, managerialism and servcism, benevolent elitism and enforced equalism and so on. Then, carefully choosing the right moment and focussing the Probability Engine chiefly upon the minds of the world's leaders, we widen the cone of the future. Two or more major possibilities are then realized instead of just one. Time is bifurcated, or trifurcated. We have alternate worlds, at first containing many objects and people in common, but diverging more and more—bifurcating more and more completely—as the consequences of the alternate decisions make themselves felt."

"I criticize," thought Oktav, plunging into uncharted waters. "You are thinking in generalities. You are personifying the world, and forgetting that major possibilities are merely an accumulation of minor ones. I do not believe that the distinction between the two major alternate possibilities in a bifurcation is at all clear-cut."

The idea was too novel to make any immediate impression, except that Oktav's mind was indeed being hazy and disordered. As if Oktav had not thought, Prim continued, "For example, we last split the time-stream thirty Earth-years ago. Discovery of subtronic power had provided the world with a practically unlimited source of space-time energy. The benevolent elite governing the world was faced with three clear-cut alternatives: It could suppress the discovery completely, killing its inventors. It could keep it a Party secret, make it a Party asset. It could impart it to the world at large, which would destroy the authority of the Party and be tantamount to dissolving it, since it would put into the hands of any person, or at least any small group of persons, the power to destroy the world. In a natural state, only one of these possibilities could be realized. Earth would only have one chance in three of guessing right. As we arranged it, all three possibilities were realized. A few years' continued observation sufficed to show us that the third alternative—that of making subtronic power common property—was the right one. The other two had already resulted in untold unendurable miseries and horrors."

"Yes, the botched worlds," Oktav interrupted bitterly. "How many of them have there been, Prim? How many, since the beginning?"

"In creating the best of all possible worlds, we of necessity also created the worst," Prim replied with a strained patience.

"Yes—worlds of horror that might have never been, had you not insisted on materializing all the possibilities, good and evil lurking in men's minds. If you had not interfered, man still might have achieved that best world—suppressing the evil possibilities."

"Do you suggest that we should leave all to chance?" Prim exploded angrily. "Become fatalists? We, who are masters of fate?"

"And then," Oktav continued, brushing aside the interruption, "having created those worst or near-worlds—but still human, living ones, with happiness as well as horror in them, populated by individuals honestly striving to make the best of bad guesses—you destroy them."

"Of course! Prim thought back in righteous indignation. "As soon as we were sure they were the less desirable alternatives, we put them out of their misery."

"Yes." Oktav's bitterness was like an acid drench. "Drowning the unwanted kittens. While you lavish affection on one, putting the rest in the sack."

"It was the most merciful thing to do," Prim retorted. "There was no pain—only instantaneous obliteration."

Oktav reacted. All his earlier doubts and flashes of rebellion were suddenly consolidated into a burning desire to shake the complacency of the others. He gave his ironic thoughts their head, sent them whipping through the dark.

"Who are you to tell whether or not there's pain in instantaneous obliteration? Oh yes, the botched worlds, the controls, the experiments that failed—they don't matter, let's put them out of their misery, let's get rid of the evidence of our mistakes, let's obliterate them because we can't stand their mute accusations. As if the Earthlings of the botched worlds didn't have as much right to their future, no matter how sorry and troubled, as the Earthlings of the main trunk. What crime have they committed save that of guessing wrong, when, by your admission, all was guesswork? What difference is there between the main trunk and the lopped branches, except your judgment that the former seems happier, more successful? Let me tell you something. You've coddled the main-trunk world for so long, you've tied your limited human affections to it so tightly, that you've gotten to believing that it's the only real world, the only world that counts—that the others are merely ghosts, object lessons, hypothetics. But in actuality they're just as throbbingly alive, just as deserving of consideration, just as real."

"They no longer exist," thought Prim crushingly. "It is obvious that your mind, tainted by Earthbound emotions, has become hopelessly disordered. You are pleading the cause of that which no longer is."

"Are you so sure?" Oktav could feel his questioning thought hang in the dark, like a great black bubble, coercing attention. "What if the botched worlds still live? What if, in thinking to obliterate them, you have merely put them beyond the reach of your observation, cut them loose from the main-trunk time-stream, set them adrift in the oceans of eternity? I've told you that you ought to visit the world more often in the flesh. You'd find out that your beloved main-trunkers are becoming conscious of a shadowy, overhanging danger, that they're uncovering evidences of an infiltration, a silent and mystery-shrouded invasion across mental boundaries. Here and there in your main-trunk world, minds are being displaced by minds from somewhere else. What if that invasion comes from one of the botched worlds—say from one of the worlds of the last trifurcation? That split occurred so recently that the alternate worlds would still contain many duplicate individuals, and between duplicate individuals there may be subtle bonds that reach even across the intertime void—on your admission, time-splits are never at first complete, and there may be unchanging *shared* deeps in the subconscious minds of duplicate individuals, opening the way for forced interchanges of consciousness. What if the botched worlds have continued to develop in the everlasting dark, outside the range of your knowledge, spawning who knows what abnormalities and horrors, like mutant monsters confined in caves? What if, with a tortured genius resulting from their misery, they've discovered things about time that even you do not know? What if they're out there—waiting, watching, devoured by resentment, preparing to leap upon your pet?"

Oktav paused and probed the darkness. Faint, but unmistakable, came the pulse of fear. He had shaken their complacency all right —but not to his advantage.

"You're thinking nonsense," Prim thundered at him coldly, in thought-tones in which there was no longer any hope of mercy or reprieve. "It is laughable even to consider that we could be guilty of such a glaring error as you suggest. We know every crevice of space-time, every twig and leaflet. We are the masters of the Probability Engine."

"Are you?" Reckless now of all consequences, Oktav asked the unprecedented, forbidden, ultimate question. "I know when I was initiated, and presumably when the rest of you were initiated, it was always assumed and strongly suggested, though never stated with absolute definiteness, that Prim, the first of us, a mental mutant and supergenius of the nineteenth century, invented the Probability Engine. I, an awestruck neophyte, accepted this attitude. But now I know that I never really believed it. No human mind could ever have conceived the Probability Engine. Prim did not invent it. He merely found it, probably by chancing on a lost talisman. Thereafter some peculiarity of the Engine permitted him to take it out of reach of its true owners, hide it from them. Then he took us in with him, one by one, because a single mind was insufficient to operate the Engine in all its phases and potentialities. But Prim never invented it. He stole it."

With a sense of exultation, Oktav realized that he had touched their primal vulnerability—though at the same time insuring his own doom. He felt the seven resentful, frightened minds converge upon him suffocatingly. He probed now for one thing only—any relaxing of watchfulness, any faltering of awareness, on the part of any one of them. And as he probed, he kept choking out additional insults against the resistance.

"Is there any one of you, Prim included, who even understands the Probability Engine, let alone having the capacity to devise it?

"You prate of science, but do you understand even the science of modern Earthlings? Can any one of you outline to me the theoretic background of subtronic physics? Even your puppets have outstripped you. You're atavisms, relics of the Dawn Civilization, mental mummies, apes crept into a factory at night and monkeying with the machinery.

"You're sorcerer's apprentices—and what will happen when the sorcerer comes back? What if I should stop this eternal whispering and send a call winging clear and unhampered through eternity: 'Oh sorcerer, True Owners, here is your stolen Engine'?"

They pressed on him frantically, frightenedly, as if by sheer mental weight to prevent any such call being sent. He felt that he would go down under the pressure, cease to be. But at the same time his probing uncovered a certain muddiness in Kart's thinking, a certain wandering due to doubt and fear, and he clutched at it, desperately but subtly.

Prim finished reading sentence. "—and so Ters and Septem will escort Oktav back to the world, and when he is in the flesh, make disposition of him." He paused, continued, "Meanwhile, Sikst will make an expedition to recover the lost talisman, calling for aid if not immediately successful. At the same time, since the functioning of the Probability Engine is seriously hampered so long as there is an empty station, Sekond, Kart and Kant will visit the world in order to select a suitable successor for Oktav. I will remain here and—"

He was interrupted by a flurry of startled thought from Kart, which rose swiftly to a peak of dismay.

"My talisman! Oktav has stolen it! He is gone!"

VI.

By her battened hatch I leaned and
caught
Sounds from the noisome hold—
Cursing and sighing of souls dis-
traught
And cries too sad to be told.
Gloucester Moors. William Vaughn Moody.

Thorn teetered on the dark edge. His footgear made sudden grating noises against it as he fought for balance. He was vaguely conscious of shouts and of a needle of green light swinging down at him.

Unavailingly he wrenched the muscles of his calves, flailed the air with his arms.

Yet as he lurched over, as the edge receded upward—so slowly at first!—he became glad that he had fallen, for the down-chopping green needle made a red-hot splash of the place where he had been standing.

He plummeted, frantically squeezing the controls of flying togs he was not wearing.

There was time for a futile, spasmodic effort to get clear in his mind how, plunging through the forest, he should find himself on that dark edge.

Indistinct funnel-mouths shot past, so close he almost brushed them. Then he was into something tangly that impeded his fall—slowly at first, then swiftly, as pressures ahead were built up. His motion was sickeningly reversed. He was flung upward and to one side, and came down with a bone-shaking jolt.

He was knee-deep in the stuff that had broken his fall. It made a rustling, faintly skirring noise as he ploughed his way out of it.

He stumbled around what must have been a corner of the dark building from whose roof he had fallen. The shouts from above were shut off.

He dazedly headed for one of the bluish glows. It faintly outlined scrawny trees and rubbish-littered ground between him and it.

He was conscious of something strange about his body. Through the twinges and numbness caused by his fall, it obtruded itself—a feeling of pervasive ill-health and at the same time a sense of light, lean toughness of muscular fiber—both disturbingly unfamiliar.

He picked his way through the last of the rubbish and came out at the top of a terrace. The bluish glow was very strong now. It came from the nearest of a line of illuminators set on poles along a broad avenue at the foot of the terrace. A crowd of people were moving along the avenue, but a straggly hedge obscured his view.

He started down, then hesitated. The tangly stuff was still clinging to him. He automatically started to brush it off, and noted that it consisted of thin, springy spirals of plastic and metal—identical with the shavings from an old-style, pre-subtronic hyperlathe. Presumably a huge heap of the stuff had been vented from the funnel-mouths he had passed in his fall. Though it bewildered him to think how many hyperlathes must be in the dark building he was skirting, to produce so much scrap. Hyperlathes were obsolete, almost a curiosity. And to gather so many engines of any sort into one building was unthought of.

His mind was jarred off this problem by sight of his hands and clothing. They seemed strange—the former pallid, thin, heavy-jointed, almost clawlike.

Sharp but far away, as if viewed through a reducing glass, came memories of the evening's events. Clawly, the symchromy, the old man in black, the conference in the Sky Room, his plunge through the forest.

There was something clenched in his left hand—so tightly that the fingers opened with difficulty. It was the small gray sphere he had stolen at the Yggdrasil. He looked at it disturbedly. Surely, if he still had that thing with him, it meant that he couldn't have changed. And yet—

His mind filled with a formless but mounting foreboding.

Under the compulsion of that foreboding, he thrust the sphere into his pocket—a pocket that wasn't quite where it should be and that contained a metallic cylinder of unfamiliar feel. Then he ran down the terrace, pushed through the straggly hedge, and joined the crowd surging along the blue-litten avenue.

The foreboding became a tightening ball of fear, exploded into realization.

That other Thorn had changed places with him. He was wearing that other Thorn's clothing—drab, servile, workaday. He was inhabiting that other Thorn's body—his own but strangely altered and ill-cared-for, aquiver with unfamiliar tensions and emotions.

He was in the world of his nightmares.

He stood stock-still, staring, the crowd flowing around him, jostling him wearily.

His first reaction, after a giant buffet of amazement and awe that left him intoxicatedly weak, was one of deep-seated moral satisfaction. The balanced had at last been righted. Now that other Thorn could enjoy the good fortunes of utopia, while he endured that other Thorn's lot. There was no longer the stifling sense of being dominated by another personality, to whom misfortune and suffering had given the whiphand.

He was filled with an almost demoniac exhilaration—a desire to explore and familiarize himself with this world which he had long studied through the slits of nightmare, to drag from the drifting crowd around him an explanation as to its whys and wherefores.

But that would not be so easy.

An atmosphere of weary secrecy and suspicion pervaded the avenue. The voices of the people who jostled him dropped to mumbles as they went by. Heads were bowed or averted—but eyes glanced sharply.

He let himself move forward with the crowd, meanwhile studying it closely.

The misery and boredom and thwarted yearning for escape bluely shadowed in almost all the faces, was so much like that he remembered from his nightmares that he could easily pretend that he was dreaming—but only pretend.

There was a distorted familiarity about some of the faces that provided undiminishing twinges of horror. Those must be individuals whose duplicates in his own world he vaguely knew, or had glimpsed under different circumstances.

It was as if the people of his own world were engaged in acting out some strange pageant—perhaps a symbolic presentation dedicated to all the drab, monotonous, futile lives swallowed up in the muck of history.

They were dressed, both men and women, in tunic and trousers of some pale color that the blue light made it impossible to determine. There was no individuality—their clothes were all alike, although some seemed more like work clothes, others more like military uniforms.

Some seemed to be keeping watch on the others. These were treated with a mingled deference and hostility—way was made for them, but they were not spoken to. And they were spied on in turn—indeed, Thorn got the impression of an almost intolerably complex web of spying and counterspying.

Even more deference was shown

to occasional individuals in dark clothing, but for a time Thorn did not get a close glimpse of any of these.

Everyone seemed on guard, wearily apprehensive.

Everywhere was the suggestion of an elaborate hierarchy of authority.

There was a steady drone of whispered or mumbled conversation.

One thing became fairly certain to Thorn before long. These people were going nowhere. All their uneasy drifting had no purpose except to fill up an empty period between work and sleep—a period in which some unseen, higher authority allowed them freedom, but forbid them from doing anything with it.

As he drifted along Thorn became more a part of the current, took on its coloring, ceased to arouse special suspicion. He began to overhear words, phrases, then whole fragments of dialogue. All of these had one thing in common: some mention of, or allusion to, the activities of a certain "they." Whatever the subject-matter, this pronoun kept cropping up. It was given a score of different inflections, none of them free from haunting anxiety and veiled resentment. There grew in Thorn's mind the image of an authority that was at once tyrannical, fatherly, arbitrary, austere, possessed of overpowering prestige, yet so familiar that it was never referred to in any more definite way.

"They've put our department on a twelve-hour shift."

The speaker was evidently a machinist. Anyway, a few hyperlathe shavings stuck to his creased garments.

His companion nodded. "I wonder what the new parts that are coming through are for."

"Something big."

"Must be. I wonder what they're planning."

"Something big."

"I guess so. But I wish we at least knew the name of what we're building."

No answer, except a tired, mirthless chuckle.

The crowd changed formation. Thorn found himself trailing behind another group, this time mostly elderly women.

"Our work-group has turned out over seven hundred thousand identical parts since the speed-up started. I've kept count."

"That won't tell you anything."

"No, but they must be getting ready for something. Look at how many are being drafted. All the forty-one-year-olds, and the thirty-seven-year-old women."

"They came through twice tonight, looking for Recalcitrants. They took Jon."

"Have you had the new kind of inspection? They line you up and ask you a lot of questions about who you are and what you're doing. Very simple questions—but if you don't answer them right, they take you away."

"That wouldn't help them catch Recalcitrants. I wonder who they're trying to catch now."

"Let's go back to the dormitory."

"Not for a while yet."

Another meaningless shift put Thorn next to a group containing a girl.

She said, "I'm going into the army tomorrow."

"Yes."

"I wish there were something different we could do tonight."

"They won't let us do anything." A weak, whining note of rebellion entered her voice. "They have everything—powers like magic—they can fly—they live in the clouds, away from this horrible light. Oh, I wish—"

"Sh! They'll think you're a Recalcitrant. Besides, all this is temporary—they've told us so. There'll be happiness for everyone, as soon as the danger is over."

"I know—but why won't they tell us what the danger is?"

"There are military reasons. *Sh!"*

Someone who smiled maliciously had stolen up behind them, but Thorn did not learn the sequence to this interlude, if it had one, for yet another shift carried him to the other side of the avenue and put him near two individuals, a man and a woman, whose drab clothing was of the more soldierly cut.

"They say we may be going on maneuvers again next week. They've put a lot of new recruits in with us. There must be millions of us. I wish I knew what they were planning to do with us, when there's no enemy."

"Maybe things from another planet—"

"Yes, but that's just a rumor."

"Still, there's talk of marching orders coming any day now—complete mobilization."

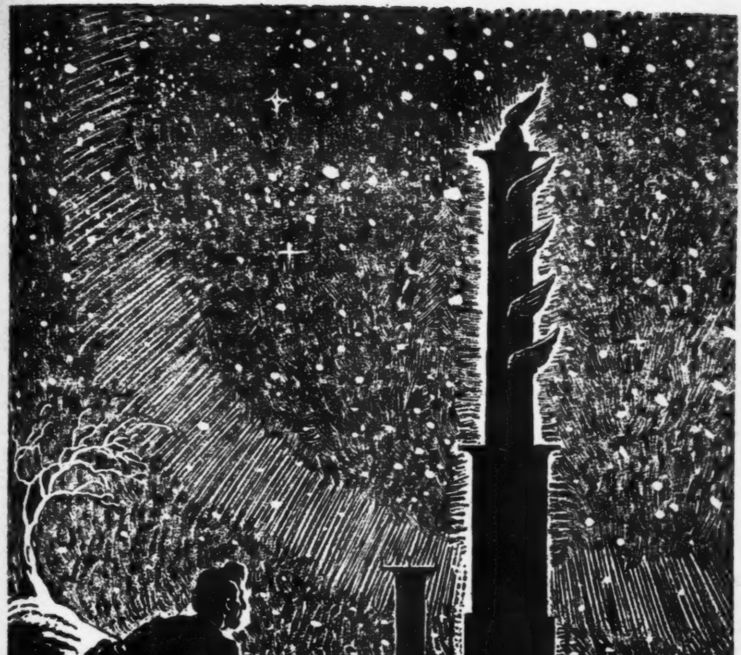
"Yes, but against what?" The woman's voice had a faint overtone of hysteria. "That's what I keep asking myself at practice whenever I look through the slit and depress the trigger of the new gun—not knowing what it is that the gun will shoot or how it really works. I keep asking myself, over and over, what's going to be out there instead of the neat little target—what it is I'm going to kill. Until sometimes I think I'm going crazy. Oh Burk, there's something I've got to tell you, though I promised not to. I heard it yesterday—I mustn't tell who told me. It's that there's really a way of escape to that happier world we all dream of, if only you know how to concentrate your mind—"

"Sh!"

This time it was Thorn's eavesdropping that precipitated the warning.

He managed to listen in on many similar, smaller fragments of talk.

Gradually a change came over his mood—a complete change. His curiosity was not satisfied, but it was quenched. Oh, he had guessed several things from what he had heard, all right—in particular, that the "new kind of inspection" was designed to uncover displaced minds like his own, and that the "way of escape" was the one the other Thorn had taken—but this knowledge no longer lured him on. The fever of



demoniac excitement had waned as swiftly as drunkenness, and left as sickening a depression in its wake. Normal human emotions were reasserting themselves—a shrinking from the ominous strangeness of this distorted world, and an aching, unreasoning, mountingly frantic desire to get back to familiar faces and scenes.

Bitter regret began to torture him for having deserted Clawly and his home-world because of the pressure of a purely personal moral problem. No knowing what confusions and dangers the other Thorn might weave for an unsuspecting Clawly. And upon Clawly alone, now that he was gone, the safety of the home-world depended. True, if most of the displacing minds from this world were only those of oppressed individuals seeking escape, they would constitute no immediate unified danger. But if the shadowy, autocratic "they" were contemplating an invasion—that would be a very different matter.

The avenue, now skirting some sort of barren hillside, had become hateful to him. It was like a treadmill, and the glaring lights prevented any extended glimpse of the surrounding landscape. He would probably have left it soon in any case, even without sight of the jam-up ahead, where some sort of inspection of all walkers seemed to be going on. As it was, that sight decided him. He edged over to the side, waited for what he thought was a good opportunity, and ducked through the hedge.

Some minutes later, panting from concentrated exertion, his clothes muddied and grass-stained, he came out on the hilltop. The darkness and the familiar stars were a relief. He looked around.

His first impression was reassuring. For a moment it even roused in him the hope that, in his scramble up the hillside, the world had come right again. There, where it should be, was the Opal Cross. There were the Gray Twins. Concentrating on them, he could ignore the unpleasant suggestion of darker, squatter buildings bulging like slugs or beetles from the intervening countryside, could ignore even the meshwork of blue-litten, crawling avenues.

But the aerial bridge connecting the Twins must be darked out. Still, in that case the reflected light from the two towers ought to enable him to catch the outlines of either end of it.

And where was the Blue Lorraine? It didn't seem a hazy enough night to blot out that vast skylon.

Where, between him and the Twins, was the Mauve Z?

Shakingly he turned around. For a moment again his hope surged up. The countryside seemed clearer this way, and in the distance the Myrtle Y and the Gray H were like signposts of home.

But between him and them, rearing up from that very hillside where this evening he had watched the Yggdrasil, as if built in a night by jinn, was a great dark skylon, higher than any he had ever seen, higher even than the Blue Lorraine. It had an ebon shimmer. The main elements of its structure were five tapering wings radiating at equal intervals from a central tower. It looked like some symbol of pride and power conceived in the dreams of primeval kings.

A name came to him. The Black Star.

"Who are you up there? Come down!"

Thorn whirled around. The blue glare from the avenue silhouetted two men halfway up the hillside. Their heads were craned upward. The position of their arms suggested that they held weapons of some sort trained upon him.

He stood stock-still, conscious that the blue glow extended far enough to make him conspicuous. His senses were suddenly very keen. The present instant seemed to widen out infinitely, as if he and his two challengers were frozen men. It burst on him, with a dreadful certainty, that those men shouting on the roof had been trying to kill him. Save for the luck of overbalancing, he would this moment be a mangled cinder. The body he was in was one which other men were trying to kill.

"Come down at once!"

He threw himself flat. There was no needle of green, but something hissed faintly through the grass at his heels. He wriggled desperately for a few feet, then came up in a crouch and ran recklessly down the hillside away from the avenue.

Luck was with him. He kept footing in his crazy, breathless plunge through the semidark.

He entered thin forest, had to go more slowly. Leaves and fallen branches crackled under his feet. Straggly trees half blotted the stars.

All at once he became aware of shouting ahead. He turned, following a dry gravelly watercourse. But after a while there was shouting in that direction, too. Then something big swooped into the sky overhead and hung, and from it exploded blinding light, illumining the forest with a steady white glare crueler than day's.

He dove to cover in thick underbrush.

For a long time the hunt beat around him, now receding a little, now coming close. Once footsteps crunched in the gravel a dozen feet away.

The underbrush, shot through with the relentless white glare, seemed a most inadequate screen. But any attempt to change position would be very risky.

He hitched himself up a little to peer through the gaps in the leaves, and found that his right hand was clutching the metal cylinder he had felt in his pocket earlier. He must have snatched it out at some stage in his flight—perhaps an automatic response of his alien muscles.

He examined the thing, wondering if it were a weapon. He noted two controlling levers, but their function was unclear. As a last resort, he could try pointing the thing and pushing them.

A rustle of leaves snapped his attention to one of the leafy gaps.

A figure had emerged on the opposite bank of the dried watercourse. It was turned away, but from the first there was something breathlessly familiar about the self-assured posture, the cock of the close-cropped, red-haired head.

The theatric glare struck an ebon shimmer from the uniform it was wearing, and outlined on one shoulder, of a somberer blackness than the uniform, a black star.

Thorn leaned forward, parting with his hand the brambly wall of his retreat.

The figure turned and the face became visible.

In a strangled voice—his first words since he had found himself on the roof-edge—Thorn cried out, "Clawly!" and rushed forward.

For a moment there was no change in Clawly's expression. Then, with feline agility, he sprang to one side. Thorn stumbled in the pitted streambed, dropped the metal cylinder. Clawly whipped out something and pointed it. Thorn started up toward him. Then—there was no sound save a faint hissing, no sight, but agonizing pain shot through Thorn's right shoulder.

And stayed. Lesser waves of it rippled through the rest of his body. He was grotesquely frozen in the act of scrambling upward. It was as if an invisible red-hot needle in Clawly's hand transfixed his shoulder and held him helpless.

Staring up in shocked, tortured dismay, the first glimmerings of the truth came to Thorn.

Clawly—*this* Clawly—smiled.

VII.

There was the Door to which I
found no Key;
There was the Veil through which
I might not see:
The Rubaiyat.

Clawly quit his nervous prowling and perched on Oktav's desk. His satanic face was set in tight, thwarted lines. Except for his rummaging everything in the room was just as it had been when he had stolen out early this morning. The outer door aslit, Oktav's black cloak thrown over the back of his chair, the door to the empty inner chamber open. As if the seer had been called away on some brief, minor errand.

Clawly was irked at the impulse which had drawn him back to this place. True, his rummaging had uncovered some suggestive and disquieting things—in particular, an assortment of small objects and implements that seemed to extend back without a break to the Late Middle Dawn Civilization, including a maddeningly random collection of notes that began in faded stain on sheets of bleached and compressed vegetable fiber, shifted to typed characters on similar sheets, kept on through engraving stylus and plastic film to memoranda ribbon and recording wire, and finally ended in multilevel writing tape.

But what Clawly wanted was something that would enable him to get a hook into the problem that hung before him like a vast, slippery, ungraspable sphere.

He still had, strong as ever, the conviction that this room was the center of a web, the key to the whole thing—but it was a key he did not know how to use.

His heels beat a muffled tattoo against the desk as he searched his mind for possible alternate avenues of attack.

Thorn? That was a whole problem in itself, only a few hours old, but full of the most nerve-racking possibilities. He took from his pouch and nervously fingered the fragment of tape with its scrawlingly recorded message which he had found earlier today on Thorn's desk at their office—that message which no one had seen Thorn leave.

> A matter of the greatest importance has arisen. I must handle it alone. Will be back in a few days. Cancel or postpone all activities until my return.
>
> Thorn.

Although the general style of recording was characteristically Thorn's, it had a subtly different swing to it, an alien undercurrent, as if some other mind were using Thorn's habitual patterns of muscular action. And the message itself, which might refer to anything, was alarmingly suggestive of a cryptic amnesiac's play for time.

On the other hand, it would be just like Thorn to play the lone wolf if he saw fit.

If he followed his simplest impulses, Clawly would resume the search for Thorn he had begun on finding the message. But he had already put that search into the hands of agencies more competent than any single individual could possibly be. They would find Thorn if anyone could, and for him to try to help them would merely be a concession to his anxiety.

His heels beat a sharper tattoo.

The research program? But that was crippled by the Committee's adverse decision, and by Thorn's absence. He couldn't do much there. Besides he had the feeling that any research program was becoming too slow and remote a measure for dealing with the present situation.

The Committee itself? But what single, definite thing could he tell them that he had not told them last night?

His own mind, then? How about that as an avenue of attack? Stronger than ever before, the conviction came that there were dark avenues leading down from his consciousness—one of them to a frighteningly devilish, chaos-loving version of himself—and that if he concentrated his mind in a certain peculiar way he might be able to slip down one of them.

There was a devil-may-care lure to those dark avenues—the promise of a world better suiting the darker, Dawn phases of his personality. And, if Thorn *had* been displaced, that would be the only way of getting to him.

But that wasn't grappling with the problem. That was letting go, plunging with indefensible recklessness into the unknown—a crazy last resort.

To grapple with a problem, you

had to have firm footing—and grab.

The tattoo ended with a sudden slam of heels. Was this room getting on his nerves? This silent room, with its feel of tangible linkages with future and past, its sense of standing on the edge of a timeless, unchanging center of things, in which action had no place—sapping his will power, rendering him incapable of making a decision, now that there was no longer a seer to interpret for him.

The problem was in one sense so clear-cut. Earth threatened by invasion from across a new kind of frontier.

But to get a grip on that problem.

He leaned across the desk and flipped the televisor, riffling through various local scenes in the Blue Lorraine. The Great Rotunda, with its aerial promenade, where a slow subtronic current carried chatting, smiling throngs in an upward spiral past displays of arts and wares. The Floral Rotunda, where pedestrians strolled along gently rolling paths under arches of exotic greenery. The other formal social centers. The endless corridors of individual enterprises, where one might come upon anything from a puppet-carver's to a specialized subtronic lab, a mood-creator's to a cat-fancier's. The busy schools. The production areas, where keen-eyed machine tenders governed and artistically varied the flow of processing. The maintenance and replacement centers. The vast kitchens, where subtle cooks ruled to a hairbreadth the mixing of foodstuffs and their exposure to heat and moisture and other influences. The entertainment and games centers, where swirling gaiety and high-pitched excitement were the rule.

Everywhere happiness—or, rather, creative freedom. A great rich surging world, unaware, save for nightmare glimpses, of the abyss-edge on which it danced.

Maddeningly unaware.

Clawly's features writhed. Thus, he thought, the Dawn gods must have felt when looking down upon mankind the evening before Ragnarok.

To be able to shake those people out of their complacency, make them aware of danger!

The seer's words returned to him: "Arm it. Mobilize it. Do not let it wait supine for the hunter—You must give it a reason . . . extemporize a danger—Mars."

Mars! The seer's disappearance had caused Clawly to miss the idea behind the word, but now, remembering, he grasped it in a flash. A faked Martian invasion. Doctored reports from the First Interplanetary Expedition—mysterious disappearance of spaceships—unknown craft approaching Earth—rumor of a vast fleet—running fights in the stratosphere—

Firemoor of the Extraterrestrial Service was his friend, and believed in his theories. Moreover, Firemoor was daring—even reckless. Many of the young men under him were of similar temperament. The thing could be done!

Abruptly Clawly shook his head,

scowled. Any such invasion scare would be a criminal hoax. It was a notion that must have been forced upon him by the darker, more wantonly mischievous side of his nature—or by some lingering hypnotic influence of Oktav.

And yet—

No! He must forget the notion. Find another way.

He slid from the desk, began to pace. Opposition. That was what he needed. Something concrete to fight against. Something, some person, some group, that was opposed to him, that was trying to thwart him at every turn.

He stopped, wondering why he had not thought of it before.

There were two men who were trying to thwart him, who had shrewdly undermined his and Thorn's theories, two men who had shown an odd personality reversal in the past months, who had impressed him with a fleeting sense of strangeness and alienage.

Two members of the World Executive Committee.

Conjerly and Tempelmar.

Brushing the treetops, swooping through leaf-framed gaps, startling a squirrel that had been dozing on an upper branch, Clawly glided into the open and made a running landing on the olive-floored sun-deck of Conjerly's home.

It was very quiet. There was only the humming of some bees in the flower garden, up from which sweet, heavy odors drifted sluggishly and curled across the deck. The sun beat down. On all sides without a break, the trees—solid masses of burnished leaves—pressed in.

Clawly crossed quietly to the dilated doorway in the cream-colored wall. He did not remove his flying togs. His visor he had thrown open during flight.

Raising his hand, he twice broke the invisible beam spanning the doorway. A low musical drone sounded, was repeated.

There was no answering sound, no footsteps. Clawly waited.

The general quiet, the feeling of lifelessness, made his abused nerves twitch. Forest homes like this, reached only by flying, were devilishly lonely and isolated.

Then he became aware of another faint, rhythmic sound, which the humming of the bees had masked. It came from inside the house. Throaty breathing. The intervals between breaths seemed abnormally long.

Clawly hesitated. Then he smoothly ducked under the beam.

He walked softly down a dark, cool corridor. The breathing grew steadily louder, though there was no change in its labored, sighing monotony. Opposite the third opened doorway the increase in volume was abrupt.

As his eyes became accustomed to the semidarkness, he made out a low couch and the figure of a man sprawled on it, on his back, arms dropped to either side, pale blob of bald head thrown limply back. At intervals the vague face quivered with the slow-paced breathing.

Clawly fumbled sideways,

switched on a window, went over to the couch.

On the floor, under Conjerly's hand, was a deflated elastoid bag. Clawly picked it up, sniffed, quickly averted his head from the faintly pungent soporific odor.

He shook the bulky sleeper, less gently after a moment.

It did not interrupt the measured snores.

The first impression of Conjerly's face was one of utter emptiness, the deep-grooved wrinkles of character and emotion a network of disused roads. But on closer examination, hints of personality became dimly apparent, as if glimpsed at the bottom of a smudgy pool.

The longer Clawly studied them, the surer he became that the suspicions he had clutched at so eagerly in Oktav's office were groundless. This was the Conjerly he had known. Unimaginative perhaps, stubborn and blunt, a little too inclined to conservatism, a little too fond of curling down those deep furrows at the corners of the mouth—but nothing alien, nothing malign.

The rhythm of the breathing changed. The sleeper stirred. One hand came slowly up, brushed blindly at the chest.

Clawly watched motionlessly. From all sides the heavy summery silence pressed in.

The rhythm of the breathing continued to change. The sleeper tossed. The hand fumbled restlessly at the neck of the loose houserobe.

And something else changed. It seemed to Clawly as if the face of the Conjerly he knew were sinking downward into a narrow bottomless pit, becoming tiny as a cameo, vanishing utterly, leaving only a hollow mask. And then, as if another face were rising to fill the mask—and in this second face, if not malignity, at least grim and unswervingly hostile purpose.

The sleeper mumbled, murmured. Clawly bent low, caught words. Words with a shuddery, unplacable quality of distance to them, as if they came from another cosmos.

". . . transtime machine . . . invasion . . . three days . . . we . . . prevent action . . . until—"

Then, from the silence behind him, a different sound—a faint crunch.

Clawly whirled. Standing in the doorway, filling half its width and all its height, was Tempelmar.

And in Tempelmar's lean, horselike face the vanishing flicker of a look in which suspicion, alarm, and a more active emotion were blended—a lethal look.

But by the time Clawly was looking straight at him, it had been replaced by an urbane, condescending, eyebrow-raising "Well?"

Again a sound from behind. Turning, backing a little so that he could take in both men at once, Clawly saw that Conjerly was sitting up, rubbing his face. He took away his hands and his small eyes stared at Clawly—blankly at first. Then his expression changed too, became a "Well?"—though more angry, indignant, less urbane. It was an expression that did not belong to the man who had lain there drugged.

The words Clawly had barely caught were still humming in his ears.

Even as he phrased his excuse—". . . came to talk with you about the program . . . heard sounds of distressed breathing . . . . alarmed . . . walked in . . ."—even as he considered the possibility of immediate physical attack and the best way to meet it, he came to a decision.

He would see Firemoor.

VIII.

In what a shadow, or deep pit of
darkness,
Doth womanish and fearful mankind live!
The Duchess of Malfi, John
Webster.

With bent shoulders, sunken head, paralyzed arm still dangling at his side, Thorn crouched uncomfortably in his lightless cell, as if the whole actual weight of the Black Star—up to the cold, cloud-piercing pinnacle where "they" held council—were upon him. His mind was tired to the breaking point, oppressed by the twisted, tyrannous world into which he had blundered, by the aching body not his own, by the brain which refused to think his thoughts in the way he wanted to think them.

And yet, in a sense, the human mind is tireless—an instrument built for weary decades of uninterrupted thinking and dreaming. And so Thorn continued to work on, revolving miseries, regrets, and fears, striving to unlock the stubborn memory chambers of the unfamiliar brain, turning from that to equally hopeless efforts to make plans. Mostly it struggled nightmarishly with the problem of escape back to his own world, and with the paradoxical riddles which that problem involved. He must, Thorn told himself, still be making partial use of his brain back in World I—to give it a name—just as Thorn II—to give him a name—must be making use of these locked memory chambers. All thought had to be based on a physical brain; it couldn't go on in emptiness. Also, since Universes I and II—to give them names — were independent, self-contained space-time set-ups, they couldn't have an ordinary spatial relationship—they couldn't be far from or near to each other. The only linkage between them seemed to be the mental ones between quasi-duplicate brains, and such linkages would not involve distance in any common sense of the term. His transition into World II had seemed to take place instantaneously; hence, pragmatically speaking, the two universes could be considered as superimposed on each other. Whether he was in one or the other was just a matter of viewpoint.

So near and yet so far. So diabolically similar to attempts to wake from a nightmare—and the blackness of his cell increased the similarity. All he had to do was summon up enough mental energy, find sufficient impetus, to force a re-

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exchange of viewpoints between himself and Thorn II. And yet as he struggled and strained through seeming eternities in the dark, as he strove to sink, to plunge, down the dark channels of the subconscious and found them closed, as he felt out the iron resistances of that other Thorn, he began to think the effort impossible—even began to wonder if World I were not just the wishful dream of a scarred, hunted, memoryless man in a world where invisible tyrants plotted un-understandable invasions, commanded the building of inexplicable machines, and bent millions to their wholly cryptic will.

At least, whatever the sufficient impetus was, he could not find it.

A vertical slit of light appeared, widened to a square, revealed a long corridor. And in it, flanked by two black-uniformed guards, the other Clawly.

So similar was the dapper figure to the Clawly he knew—rigged out in a strange costume and acting in a play—that it was all he could do not to spring up with a friendly greeting.

And then, to think that this Clawly's mind was linked to the other's, that somewhere, just across its subconscious, his friend's thoughts moved— Dizzying. He stared at the trim, ironic face with a terrible fascination.

Clawly II spoke. "Consider yourself flattered. I'm going to deliver you personally to the Servants of the People. They'll want to be the ones to decide, in your case, between immediate self-sacrifice, assisted confession, or what not." He chuckled without personal malice. "The Servants have devised quite amusing euphemisms for Death and Torture, haven't they? The odd thing is, they seem to take them seriously—the euphemisms, I mean."

The uniformed guards, in whose stolid faces were written years of unquestioning obedience to incomprehensible orders, did not laugh. If anything, they looked shocked.

Thorn staggered up and stepped slowly forward, feeling that by that action he was accepting a destiny not of his own making but as inescapable as all destinies are, that he was making his entrance, on an unknown stage, into an unknown play. They started down the corridor, the guards bringing up the rear.

"You make rather a poorer assassin than I'd have imagined, if you'll pardon the criticism," Clawly II remarked after a moment. "That screaming my name to get me off guard—a very ill-advised dodge. And then dropping your weapon in the streambed. No—you can't exactly call it competent. I'm afraid you didn't live up to your reputation of being the most dangerous of the Recalcitrants. But then, of course, you were fagged."

Thorn sensed something more in the remarks than courteous knife-twisting. Undeniably, Clawly II was vaguely aware of something off-key, and was probing for it. Thorn tightened his guard, for he had decided on at least one thing in the dark—that he would not reveal that he was a displaced mind, except to escape some immediate doom. It might be all right if they would consider him insane. But he was reasonably certain they would not.

Clawly II looked up at him curiously. "Rather silent, aren't you? Last time we met, as I recall, you denounced me—or was it the things I stood for?—in the most bitter language, though with admirable restraint. Can it be that you're beginning to reconsider the wisdom of recalcitrance? Rather late for that, I'm afraid."

He waited a while. Then, "It's you that hate me, you know. I hate no one." He caught Thorn's involuntary grimace, the twitch of the shoulder from which hung the paralyzed right arm. "Oh, I sometimes hurt people, but that's mainly adjustment to circumstances — quite another thing. My ideal, which I've pretty well achieved, is to become so perfectly adjusted to circumstances that I float freely on the stream of life, unannoyed by any tugs of hate, love, fear, caution, guilt, responsibility, and so forth—all the while enjoying the spectacle and occasionally poking in a finger."

Thorn winced—Clawly II's remarks were so similar to those which Clawly I sometimes made when he was in a banteringly bitter mood. Certainly the man must have some sort of suspicions and be trying to draw him out—he'd never talk so revealingly otherwise. Beyond that, there was the suggestion that Clawly II was bothered by certain unaccustomed feelings of sympathy and was trying to get to the bottom of them. Perhaps the independence of quasi-duplicate minds wasn't as complete as it had at first appeared. Perhaps Clawly I's emotions were obscurely filtering through to Clawly II. It was all very confusing, unnervingly so, and Thorn was relieved when their entry into a large room postponed the moment when he would have to decide on a line of answers.

It was an arresting room, chiefly because it was divided into two areas in which two separate ways of life held sway, as clearly as if there had been a broad white line extending across the middle, with the notice, "Thou shalt not pass." On this side was quite a crowd of people, most of them sitting around on benches, a few in black uniforms, the rest in servile gray. They were all obviously waiting—for orders, permissions, judgments, interviews. They displayed, to an exaggerated degree, that mixture of uneasiness and boredom characteristic of people who must wait. Four words sprang to Thorn's mind, summing them up. *They did not know.*

On the other side were fewer people—a bare half dozen, seated at various desks. Their superiority was not obviously displayed. Their clothing was, if anything, drabber and more severe, and the furnishings they used were in no way luxurious. But something in their manner, something in the way they glanced speculatively up from their work, put gulfs between

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them and those who uneasily waited. This time only two words were needed. *They knew.*

Clawly II's arrival seemed to cause an increase in the uneasiness. At least, Thorn caught several frightened glances, and sensed a general relaxing of tension when it became obvious that Clawly II's mission did not concern anyone here. He also noted that the two guards seemed relieved when Clawly dismissed them.

One other glance he thought he caught was of a perplexingly different sort. It was directed at him rather than Clawly II. It came from an elderly, gray-clad man, whose face awoke no sense of recognition either in this world or his own. It conveyed, if he was not mistaken, sympathy, anxiety, and—strangest of all—*loyalty.* Still, if Thorn II had been some sort of rebel leader, the incident was understandable. Thorn quailed, wondering if he had put himself into the position of betraying a worthy movement in this world as well as his own.

Clawly II seemed to be a person of reputation on the other side of the room as well, for his clipped, "To the Servants' Hall, with a person for the Servants," passed them through without a question.

They entered another corridor, and their surroundings began to change very rapidly. A few paces brought them to a subtronic tube. Thorn was glad that he was startled into moving jerkily when the upward-surging current gripped them, for a glance at Clawly II warned him that it would not be well to show much familiarity with this form of transportation.

And now, for the first time since his plunge into World II, Thorn's mind began to work with clarity. It may have been the soothing familiarity of the current.

Obviously, in World II subtronic power was the closely-guarded possession of a ruling elite. There had

been no evidence at all of its employment on the other side of the dividing line. Moreover, that would explain why the workers and soldiers on the other side were kept ignorant of the true nature and theory of at least some of the instruments they constructed or used. It would also explain the need for the vast amount of work—there were two ways of life, based on entirely different power-systems, to be maintained.

Then as to the relationship between Worlds I and II. For closely related they must be—it was unthinkable that two eternally independent universes could have produced two near-identical Opal Crosses, Gray Twins, Clawlys, Thorn, and an uncounted host of other similars; if one granted that possibility, one would have to grant anything. No—Worlds I and II must be the results of a split in the time-stream, however caused, and a fairly recent split at that, for the two worlds contained duplicate individuals and it was again unthinkable that, if the split had occurred as much as a hundred years ago, the same individuals would have been born in the two worlds—the same gametes, under different circumstances, still uniting to form the same zygotes.

The split must—of course!—have occurred when the nightmare-increase began in World I. About thirty years ago.

But—Thorn's credulity almost rebelled—would it have been possible for two worlds to become so different in a short time? Freedom in one, tyranny in the other. Decent people in one, emotional monsters and cringing, embittered underlings in the other. It was horrible to think that human nature, especially the nature of people you loved and respected, could be so much the toy of circumstance.

And yet—the modern world was keyed for change. Wars could, had, come overnight. Sweeping technological changes had been accomplished in a few months. And granting such an immense initial difference as the decision to keep subtronic power a government secret in World II, to make it public property in World I—

Moreover, there was a way of testing. Without pausing to consider, Thorn said, "Remember when we were children? We used to play together. Once we swore an oath of undying friendship."

Clawly II twisted toward him in the current, which was now taking them up past winking corridor entries.

"You *are* breaking," he remarked in surprise. "I never expected a play for sympathy. Yes, of course I remember."

"And then about two years later," Thorn plunged on, "when our glider dropped in the lake and I was knocked out, you towed me ashore."

Clawly II laughed, but the puzzled look around his eyes deepened. "Did you really believe I saved you? It hardly fits with your behavior toward me afterwards. No, as I think you know, I swam ashore. That was the day on which I first realized that I was I, and that everything and everybody else was circumstances."

Thorn shivered, as much in horror of this changeling beside him as in satisfaction at having checked the date of the time-split. Then he felt revulsion rising in him, more from the body he occupied than from his own thoughts.

"There isn't room in the world for even two people with that attitude," he heard himself challenge bitterly.

"Yes, but there is room for one," Clawly II replied laughingly. Then he frowned and continued hesitatingly, as if against his better judgment. "Look, why don't you try the same thing? Your only chance with the Servants is to make yourself useful to them. Remember, they too are just something to be adjusted to."

For a moment it seemed to Thorn as if Clawly I were striving to look through the eyes of Clawly II. As he tried to gain control of the baffling jumble of emotions this sensation produced, Clawly II took him by the arm and steered them into the slower periphery of the current, then into a dead-current area before the mouth of a short pedestrian corridor.

"No talk from here on," he warned Thorn. "But remember my advice."

There were calculatingly-eyed guards inside the corridor mouth, but again a mere "With a person for the Servants" passed them in.

A low, gray door, without numeral or insignia, blocked the end of the corridor. Some yards short of it was a narrow side-door. Clawly II touched something and the side-door opened. Thorn followed him through it. After a few paces down a dim, curving passageway, they came to a large room, but Clawly II stopped them just short of it. Again he touched something. A door slid silently out of the wall behind them, changing the end of the passageway into a dark niche in the room ahead. Signing to Thorn that they were to wait and watch, Clawly II leaned back with a slow speculative smile.

IX.

Black Star, would I were steadfast as thou art—
John Keats (with an ironic alteration)

It was a notably bare room, smaller and lower-ceilinged than he had expected. It was furnished with ostentatious simplicity, and nothing broke the gray monotony of the walls.

Around the longer side of a kidney-shaped table, eleven men sat on stools. Their gray tunics, though clean, were like those of beggars. They were all old, some bald, some capped with close-cropped white or gray. They all sat very erect.

The first thing that struck Thorn—with surprise, he realized—was that the Servants of the People looked in no way malignant, villainous, or evil.

But looking at them a second time, Thorn began to wonder if there was not something worse. A puritanic grimness that knew no humor. A suffocating consciousness of responsibility, as if all the troubles of the world rested on their shoulders alone. A paternal aloofness, as if everyone else were an irresponsible child. A selflessness swollen to such bounds as to become supreme selfishness. An intolerable sense of personal importance that their beggarly clothes and surroundings only emphasized.

But Thorn had barely gleaned this impression, had had no time to survey the faces in detail, except to note that one of two seemed vaguely familiar, when his attention became rivetted on the man who was standing on the other side of the table, the focus of their converging eyes.

That man was obviously one of them. His manner and general appearance were the same.

But that man was also Conjerly.

He was speaking. "I must return at once. The soporific I inhaled into my other body will wear off shortly, and if the other mind becomes conscious, exchange will be difficult. True, Tempelmar is on guard there and could administer another dose. But that is dangerous. Understand, we will attempt no further exchanges unless it becomes necessary to transmit to you information of vital importance. The process is too risky. There is always the possibility of the mental channels being blocked, and one or both of us being marooned here."

"You are wise," observed the midmost of the Servants, apparently their chairman, a tall thin man with wrinkle-puckered lips. "No further exchanges should be necessary. I anticipate no emergencies."

"And so I take my leave," Conjerly continued, "assured that the trans-time machine is ready and that the invasion will begin in three days, at the hour agreed. We will prevent the World Executive Committee from taking any significant action until then."

Thorn leaned forward, half guessing what was coming. Clawly II's hand touched his sleeve.

Conjerly bowed his head, stood there rigid. Two black-uniformed guards appeared and took up positions close to him, one on either side.

For a full half minute nothing happened.

Then a great shiver went through Conjerly. He slumped forward, would have fallen except for the two guards. He hung in their arms, breathing heavily.

When he raised his face, Thorn saw that it had a different expression, was that of a different man. A man who looked dazed and sick.

"Where—? Who?" he mumbled thickly. The guards began to lead him out. Then his eyes cleared. He seemed to recognize the situation. "Don't lock me up. Let me explain," he cried out, his voice racked by a desperate yet hopeless urgency. "My name's Conjerly. I'm a member of the World Executive Committee." His face, twisted back over his shoulder, was a white, uncomprehending mask. "Who are you? What do you want out of me? Why am I drugged? What have you done to my body? What are you trying to do to my mind? What—"

The guards dragged him out.

The wrinkle-lipped chairman lowered his eyes. "A distressing occurrence. But, of course, strictly necessary. It is good to think that, when we have things under control in the other world, no such confinements and withholdings of permissible information will have to be practiced—except, of course, in the case of hopeless Recalcitrants."

The others nodded silently. Then Thorn started, for from beside him came an amused, incredulous snicker—not a polite or pleasant sound, and certainly unexpected.

All eyes were turned in their direction.

Clawly II strode out leisurely.

"What did your laughter signify?" The chairman asked sharply, without preliminaries, a look of displeasure settling on his face. "And who is that you have smuggled into our council, without informing us? Let me tell you, some day you will go too far in your disregard of regulations."

Clawly II ignored the second question—and the comment. He swaggered up to the table, planted his hands on it, looked them over, and said. "I laughed to think of how sincerely you will voice your distress when you discover all inhabitants of the other world to be hopeless Recalcitrants—and take appropriate measures. Come, face circumstances. You will be forced to destroy most of the inhabitants of the other world, and you know it."

"We know nothing of the sort," replied the chairman coldly. "Take care that your impudent and foolish opinions do not make us lose confidence in you. In these critical times your shrewdness and ingenuity are valuable to us. You are a useful tool, and only imprudent men destroy a tool because its mannerisms annoy them. But if, in your foolhardy opinionatedness you cease to be useful—that is another matter. As regards the misguided inhabitants of the other world, you very well know that our intentions are the best."

"Of course," agreed Clawly II, smiling broadly, "but just consider what's actually going to happen. In three days the trans-time machine will subtronically isolate and annihilate a spatio-temporal patch in this world, setting up stresses which cannot be relieved by any redistribution of material in this world; accordingly the lacuna will find with the corresponding patch from the other world, thereby creating an area common to both worlds. Through this common area your armed forces will pour. They will come as invaders, awakening horror and fear. They will have the element of surprise on their side, but there will inevitably be resistance—organized in desperate haste, but using improvised subtronic weapons. Most important, that resistance will not come, as it would in this world, from a small elite directing an ignorant multitude, but from a people of uniformly high education—a people used to freedom and adverse to submitting to any autocratic government, no matter how well-intentioned. That resistance will not cease until the other world has been destroyed in subtronic battle, or you are forced to destroy it subtronically yourselves and retire through the gap. All that is painfully clear."

"It is nothing of the sort," replied the chairman in measured and dispassionate tones. "Our invasion will be well-nigh bloodless, though we must prepare for all eventualities. At the proper moment Conjerly and Tempelmar will seize control of the so-called World Executive Committee, thereby preventing any organized resistance at the fountainhead. The majority of inhabitants of the other world have no technical knowledge of subtronic power and will therefore constitute no danger. Ultimately they will be grateful to us for insuring the safety of their world and protecting them from their irresponsible leaders. It will only be necessary for us to capture and confine all technicians and scientists having a knowledge of subtronic physics. To do this, we must admittedly be ready to take any and all necessary steps, no matter how unpleasant. For our main purpose, of which we never lose sight, is always to keep the knowledge of subtronic power—which now imperils two worlds—in the possession of a small, responsible, and benevolent elite."

Thorn shivered. The horrible thing was that these Servants actually believed that they were acting for the best, that they had the good of mankind—of two mankinds—at heart.

"Exactly," said Clawly II, continuing to smile. "The only thing you don't see, or pretend not to see, is the inevitable consequences of that main purpose. Even now your secrets are gravely endangered. Mind-exchange is putting more and more Recalcitrants and Escapists into the other world. It is only a matter of time before some of them begin to realize that the inhabitants of that world are their potential allies rather than their foes, and join forces with them. Similarly it is only a matter of time until the mind of a subtronic technician is displaced into this world and contacted by the Recalcitrants here—then you will have to fight subtronic wars in two worlds. Your only chance, as I'm glad you recognize in part, is to strike hard and fast, destroy the other world, along with all the Recalcitrants and Escapists who have entered it, then seek out and eliminate all displaced minds in this world. Your weakness is in not admitting this at the start. Everything would be much easier if you would leave out pseudobenevolent intentions and recognize that you are up against an equation in destruction, which you must solve in the only logical way possible—by a general canceling out."

And he rocked back on his heels a little, again surveying the eleven old faces. It struck Thorn that thus legendary Loki must have mocked the Dawn Gods and flayed their high-sounding pretenses, confident that his cunning and proven usefulness would protect him from their wrath. As for the Servants, their paternalism was unpleasantly apparent in their attitude toward Clawly II. They treated him like a brilliantly mischievous favorite child—always indulged, often threatened, seldom punished.

Certainly there was a germ of greatness about this Clawly II. If only he had Clawly I's sane attitude toward life, so that his critical thinking would come to something more than mere sardonic jibing!

One thing was certain, Clawly II's claim that he wanted to float on the stream of life was a gross understatement. What he really wanted was to dance along a precipice—and this time, apparently, he had taken one heedless step too many.

For the chairman looked at him and said, "The question arises whether your insistence on destruction has not assumed the proportions of a mania. We will at once reconsider your usefulness as a tool."

Clawly II bowed. He said smoothly, "First it would be well to interview the person I have brought you. You will be pleased when I tell you who he is." And he motioned to Thorn.

All eyes turned on the niche.

Abruptly, painfully, Thorn woke from his impersonal absorption in the scene unrolling before him. Again it came to him, like a hammer blow, that he was not watching from the safety of a spy-hole, but was himself immediately and fatally involved. Again the urge to escape racked him—with redoubled force, because of the warning that he must now at all costs take back to World I. It was such a simple thing. Just a change of viewpoints. He had seen Conjerly accomplish it. Surely, if he concentrated his mind in the right way, it would be that other Thorn who walked forward to face the Servants and the destiny of that other Thorn's own making, while he sank back. Surely his need to warn a world would give him sufficient impetus.

But all the time he was walking toward the table. It was *his* dragging feet that scuffed the gray flooring, *his* dry throat that swallowed, *his* cold hands that clenched and unclenched. The eleven old faces wavered, blurred, came clear again, seemed to swell, grow gray and monstrous, become the merciless masks of judges of some fabled underworld, where he must answer for another man's crimes.

The table stopped his forward progress. He heard Clawly II say, "I am afraid that I am still very useful to you. Here is your chief enemy, brought to book by my efforts alone. He was part of our bag when he raided the local Recalcitrant headquarters last night. He escaped and took to the hills, where I personally recaptured him —the Recalcitrant leader Thorn 37-P-82."

But the Servants' reaction could not have been the one Clawly was expecting, for the old faces registered anger and alarm. "Irresponsible child!" the chairman rapped out. "Didn't you hear what Conjerly reported—that he is certain there has occurred a mind exchange between the Thorns? This man is not the Recalcitrant, but a displaced mind come to spy on us. You have provided him with what he wanted —an opportunity to learn our plans."

Thorn felt their converging hostility—a palpable force. His mind shrank back from the windows of his eyes, but, chained there, continued to peer through them.

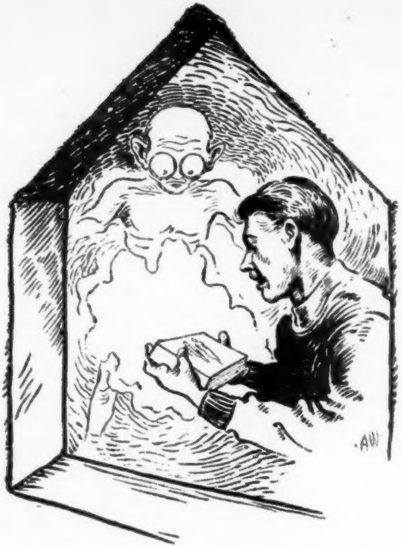
The chairman's wrinkled hand dropped below the table. He said, "There is only one course of action." His hand came up, and in it a slim gleaming cone. "To eliminate the displaced mind before a re-exchange can be—"

Thorn was dimly conscious of Clawly II leaping forward. He heard him begin, "No! Wait! Don't you see—"

But although that was all he heard, he knew what Clawly II was going to say and why he was going to say it. He also knew why Thorn II had been able to exchange with him when Thorn II thought he was trapped and facing death on the rooftop. He knew that the chairman's action was the very thing that would nullify the chairman's purpose. At last he had found the sufficient impetus—it was staring at him down the slim, gleaming cone, leering at him even as the chains broke and his mind dropped back from the windows of his eyes into a black, dimensionless pit.

The fear of death.

TO BE CONCLUDED.



***On strange** planets of strange stars, you're apt to find natives who are thieves by nature, persuasion, or education. But not many such thieves as lived on that planet!*

Filch

by FRANK BELKNAP LONG

Illustrated by Williams

All Griscom had to show for his eighteen months on Rigel's third planet was a haunted stare, and a storeroom littered with rubbish. He felt walled in, beaten down, and spiritually suffocated. He felt angry and resentful and victimized. He felt like a stooge and a zany. He couldn't even—well, it was hard to put into words, but when he eavesdropped on his own subconscious he couldn't be sure the code numerals were the ones he'd put there.

Not that he was in any danger of cracking up physically. So far he'd maintained his footing despite a physical environment which was all wet in patches. Everything he touched was either streaked with damp, or drier than the rasp of pumice on a revolving metal cylinder. Everything—for all seven of the Rigel sun planets were dry-moist and had a checkerboard quilt sort of atmosphere.

There were patches of damp green rot on the metal-sheeted walls of the company buildings, and when he walked his shoes spurted dust and a haziness swirled up about him. But so far he'd squared off, and taken the arid tundra and night-heavy clouds in his stride. He hadn't even beefed to the home office.

He wasn't beefing now. Having pulled off his boots, he sat squinting through a haze of tobacco smoke at a much younger man than himself, his long face a sickly brown study.

"You smoke shag?" the youth asked, wrinkling his nose.

The gaunt skeleton that was Griscom turned slightly, and ladled up a spoonful of the unsavory stew which was dawdling to a boil on the small magneto-grill at his elbow.

"Yeah," he grunted. "It's about the only thing out here I like. The coarser the better."

Griscom sniffed at the stew as he spoke, blew upon it, and forced himself to take a sip. He shuddered as the spoon caressed his palate, a hot resentment in his stare. Then it occurred to him that a schizoid would have felt no such repugnance and relief swept into his eyes.

He laughed harshly. "I'm afraid smoking is becoming an obsession with me. Strong tobacco is a powerful disinfectant, you know."

The youth smiled nervously. "I still think—"

"I know what you're going to say," Griscom interposed, with a wry grimace. "I should have gone native. When in Rome do as the Romans do, eh? Well, we're not in Rome, and you'll find out what going native means quickly enough. When you do, there's one thing I can promise you. It won't smell like shag, or anything you've ever met."

The young man—his name was Richard Bosworth—seemed bewildered. "But, sir, I thought—"

"You thought, because I O.K.'d your ideas on a sidereal communication disk, I'd stay on and be your father-confessor? No, my dear chap—no. I played a scurvy trick on you. In theory your ideas are appealing, even brilliant, but if I had to be here when they really take hold of you—"

He shrugged, and knocked the dottle from his pipe.

"I'm sorry if my record misled you. When you've lived as long as I have, you'll know that the greatest human gifts have about as much relation to a man's integrity as the color of his hair. And I'm just a shrewd company haggler. I tell you, I'm fed up, and—you'd better get spruced up. We've a redhead here who hopes I'll stay on. When she sees you I can fade out with better grace."

Bosworth stroked his chin, which was covered with a three days' growth of stubble. "Yeah, I guess I could do with a shave and a tubbing. In space you sort of neglect—"

"You'll have plenty of time to look your worst," Griscom assured him. "Besides, the natives can't grow hair, and beards don't set well with them. They're just human enough to resent what they can't imitate."

The redhead was an unbelievable phenomenon so far from the Solar System, her eyes especially. It had taken Bosworth a full hour to recover from the shock of Griscom's ultimatum. Now, moving about the storeroom, he could hear her fast, staccato breathing, and felt suddenly rudderless again.

In a clash of masculine wills there was always a rapierlike give and take to give a man a feeling of confidence. But how could he defend himself against the scorn of a frail, trembling girl who regarded him as a pariah?

He knew she was following his every movement with the same dark eyes she had used to drill holes in his self-assurance. Griscom had delivered a body blow to his chances of taking refuge behind a barrier of reticence by the informality of his introduction.

"Joan, this is Dick Bosworth. You know why he's here, so it shouldn't come as too great a shock to you."

Horror and loathing had flared in Joan Mallory's stare, and she had looked away quickly.

If only she'd kept her gaze averted he might have endured the mounting tension, the feeling that she resented having him near her, and would have screamed if he touched her.

It came suddenly, in a vehement whisper so laden with scorn it completely unnerved him.

"I'd rather a struvebeast clawed out my throat," she said, bending over a miserable shard of something that looked like a bullet-riddled tea kettle. "Jim never would, and I've always respected him for it."

Anger is a strange emotion. Bosworth had never known just how strange till he felt it take complete possession of his vocal cords, and heard himself saying in a voice which he scarcely recognized as his own: "If you expect to trade with an alien race, you've got to find out what makes them tick. You've got to get as close as possible to bedrock by living as they do. What if their inner springs do vibrate to nonhuman rhythms? So do the springs inside a clock, but you can get a clock to co-operate if you understand the winding mechanism.

"You may get a little greasy, but you can pretty well master the mechanism of a clock if you keep taking it apart and putting it together again. Any clock—and the same goes for the psychology of an alien race. The reason Griscom found himself tricked and outguessed at every turn was because he adopted a superior, standoffish attitude. Griscom's a great proctor, but these Rigel System planetarians are so totally unlike—"

"You'll never know how unlike

till you've sat down to eat with them," the girl interposed, with passionate conviction. "Eat—carouse with them. You'll find out."

"Will I?"

"That's what they wanted Jim to do. If he had, we'd have something more valuable to pack and ship back to Terra than a few wretched crockery fragments. Earthern potsherds are a credit a dozen. Oh, the company can sell this rubbish to the Institute of Galactic Archaeology for enough fluid currency to pay your salary and mine. But Jim could have filled the sheds with jeweled ornaments and urns of beaten gold. Once he went just far enough to—"

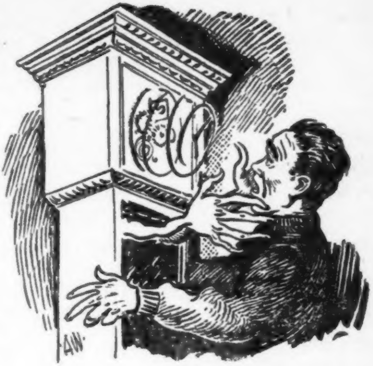
She shuddered, and stared at him out of eyes that seemed to fill her face. "Jim told me about it. It was a ghastly, a completely sobering experience. You were just now talking about clocks. Suppose you were to open up a big, old grandfather clock—just to see what makes it tick, just to study the winding mechanism. Your hands are inside and you are fumbling around and suddenly—it grabs hold of you! Instead of wheels and pulleys something reaches out and grabs you. Suppose it is all alive inside, and not even three-dimensional."

"It was as bad as that, was it?"

"It was worse than that, a simplicity of evil beyond anything I could have imagined. I can't even—talk about it."

Bosworth stared at her levelly. "You mean you don't want to talk about it."

"I can't, I won't. Jim knows what may happen to you, and in a



way, he'd give his right arm to prevent it. But right now his decent human instincts are waging a terrible struggle with his loyalty to the company. He knows how kind the natives would be; how generous they'd be. They wouldn't haggle with you for wretched potsherds. Oh, no—they'd shower you with presents."

"And Griscom knows what that could mean to the company?"

She nodded. "He can't go native himself," she said, firmly. "His pride, his inner integrity would be outraged. The shame would never wear off. But when you volunteered, when the home office beamed you were young and confident and eager he O.K.'d your appointment."

"Go on."

"You know how company reprimands creep into your skin when you're talking into a sidereal communication disk. The light-years fall away, and you feel you're actually on Terra. Yet just talking across such a vast distance makes you unsure of yourself, makes you . . . well, it warps your perspective."

"I get it. Griscom wants the natives to trot out their best silverware. So I stick my neck out, I put my head on the chopping block, and he looks the other way. He's a grand guy—but squeamish. He doesn't want to watch the blade descend."

"You didn't have to stick your neck out!" the girl retorted, her color rising. "You didn't have to, you *didn't*—"

Bosworth narrowed his eyes. "No-o," he said, slowly, "I suppose not."

Clumping away from the trading post over the moist-dry plain Bosworth found himself wondering why his thoughts kept fluttering back and forth like prismatic may-flies over the stagnant marish-moss inside his head.

He was feeling the strain now, he told himself grimly. Rigel wasn't exactly an easy sun to get to, and the long journey through space had strained his nerves to the breaking point.

His eyes swept the arid plain, roamed over everything. The frown on his face showed the uneasiness he felt. Space-warp travel had an advantage over mere planet hopping in a rocket-driven ship, but when a man came out through the yawning gravity-port of a spiral-nosed sidereal cruiser he had to expect to feel shaken up a bit.

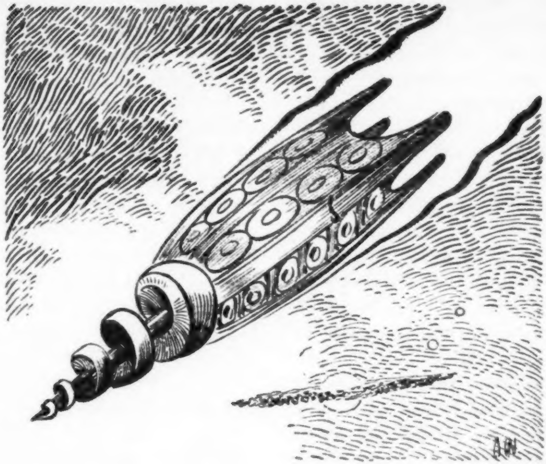
It was curious, but his brain felt limpid somehow, as though the long journey had melted it down and catalyzed it with little floating grains of lunacy. Everything about the Rigel System planet seemed off key and subtly out of alignment. What was even more disturbing, he couldn't seem to shake off an inner sense of foreboding, as though something he couldn't even begin to visualize were getting ready to lay an egg directly in his path. An egg filled with explosive possibilities, an egg—

He checked himself abruptly. What was the matter with him? Was he running a fever, or was it just the effect of the harsh, bright sunlight slanting down through rifts in the clouds, and glittering in crazy-quilt patches on the moist-dry soil?

There were no winds to dispel the intermittent humidity, but off to his left the receding company buildings were smoldering in a deep, purple haze which was soothing to his vision. With a shudder he fastened his gaze on the distant, metal-sheeted walls of the compound, and plunged on doggedly. He wasn't going to allow himself to think such thoughts, he told himself grimly. Not while his strength held out, and he could keep on walking.

He knew that natives would seek him out if he just kept on walking. They were probably watching him now from a distance, for their telescopic eyes could discern a walking human before their sensitive nostrils could detect one.

Somehow the thought rankled. They were watching him, and he couln't watch back. He couldn't even smell back. He couldn't—



There it was again—that light-headed feeling, as though he'd been given a thousand nursery rhymes, a thousand meaningless jingles to repeat with Socratic inflections. Don't stop, don't leave out a single line, or *you'll be sorry!*

Suddenly—Bosworth caught on! Griscom had warned him to anticipate this. They were feeling out his thoughts from a distance! His light-headedness was caused by a stream of almost formless thoughts flowing into his brain, and mingling with the thoughts already there. Thoughts like fluid scalpels, twisting, turning—setting up a mental whirring.

He wished they'd stop. They were violating the privacy of his mind in a very disturbing way, because he had no way of knowing just how deeply they could probe. He wondered a little wildly how much Griscom knew. How much had Griscom kept back, how much—

Thoughts couldn't hurt him. After all, he wasn't a child. Sticks and stones could break his bones, but thoughts couldn't touch him. They'd have to stop soon because they were drawing closer to him. He could feel them drawing closer, and he was sure the instant he saw them the probing would stop. They'd know by then why he had walked out to meet them.

Griscom had warned him he'd get a shock when he saw them. He'd looked at a few photographs and returned them to Griscom with a slight shrug, as though he hadn't been at all put out.

Actually, he'd been shocked, and—revolted? No, that was too strong a word. Square the shade of difference between repulsion and revulsion, and the right word would emerge. It wasn't disgust, exactly, but the human race has never quite reconciled itself to exposed digestive organs. Perhaps it would be more correct to say it has never overcome a deep, instinctive horror, shared by all primates, of unsanitary housing facilities.

In appearance the Rigel System planetarians were close enough to humanity to be repulsive on that account alone. Griscom had warned him there were aspects of skin texture and expression which no photograph could capture, but—the photographs had been the opposite of vague.

It was curious, but when he shut his eyes he could see them now, stalking the gray tundra like Fuseli nudes, their owlish faces thrust sharply forward, and their skeleton-thin bodies glinting in the harsh sunlight.

The visualization seemed as natural as breathing. What he did not know was that he was seeing them in his mind's eye when he might just as well have been staring straight before him.

Like most contagious diseases, fear has a brief incubation period.

Even when Bosworth opened his eyes and saw them squatting on the moist-dry soil in a semicircle about him his immediate reaction was merely one of surprise.

Though a dark current was sweeping into his mind he told himself simply that they were much uglier than he'd imagined they would be. Much, much uglier. Their flesh was caked with dust, their lips were cracked and blistered, and the series of collapsing lenses which enabled them to telescope their vision at will overlapped in concentric ridges, giving to their faces in repose a distinctly goggle-eyed appearance.

For the barest instant fear convulsed Bosworth, and then—ceased to have any influence over him. There swept in upon him instead an immense calmness, a feeling of gratitude and deliverance. It was like—being intoxicated. It was even partly physical. He could feel a warmth creeping up inside him—bridging a gap, breaking down a barrier.

Surely there could be very little difference between a human and the creature who sat directly in his path, regarding him with an expression vaguely reminiscent of—a stuffed pig's head, he thought idiotically. How could there be, when he could share that creature's inmost thoughts and emotions?

"You are the new young proctor?" the creature asked, elevating its haunches and waving its claw-like hands at him.

"I am nothing if I am not your friend," Bosworth heard himself replying.

"Then you will feed with us?" the creature asked.

"Yes. I . . . I would be honored."

"Then come, my friend, my brother. We will feast together."

The food gagged Bosworth, but he forced himself to eat it. Everything else was so agreeable it would'nt have seemed right to refuse the food. Thick chunks of something that certainly wasn't meat, floating in an evil-smelling gravy, had been set before him in a shallow earthern pan, and he was doing his best to ladle it up, plunk it in his mouth, and forget about it.

He couldn't quite forget the taste, which had a way of lingering on despite a fluid intake far in excess of his customary drinking habits.

The beverage certainly wasn't bad. It set up a wet tingling on his palate, and brought a glow to his vision when he raised his eyes to the sloping stone roof of the hut.

Phonetically his host's name was Glu-gub-gun, but Bosworth had found it more convenient to slur the middle syllable, and address the dear chap merely as Glugun. There was no way of evading the friendliness which Glugun exuded. There flowed from him a continuous solicitude which took the form of replenishing the earthern platter with more chunks of the unsavory goulish, and refilling Bosworth's goblet till a giddiness swept over him.

He looked at Glugun across the eating board, noticed how emaciated he seemed, and felt an overwhelming pity for him.

"You don't eat enough, Glugun," he wanted to say.

It was curious how many things he wanted to tell Glugun. Things he wouldn't have dreamed of confiding to Joan Mallory, and certainly not to Griscom. Things all humans would like to confide to other humans, but didn't dare for fear of something which was a little difficult to define.

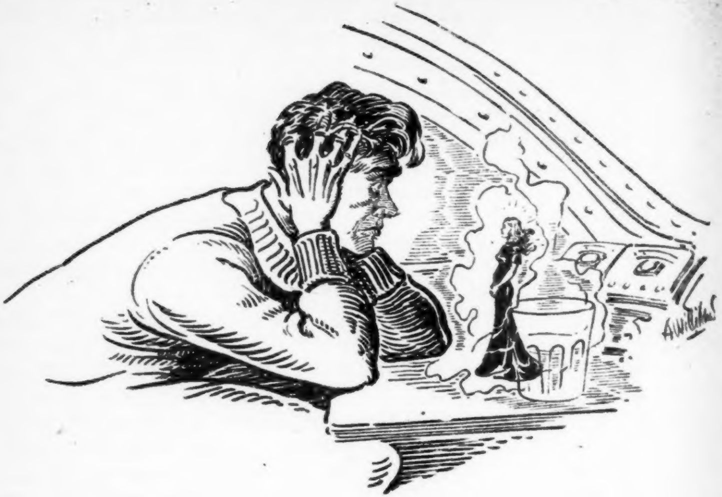
In general all humans shared the same frailties, but if you let down your hair and the other chap didn't you were at a disadvantage. With Glugun he just didn't feel that way at all. Was it because he felt so superior to Glugun that no advantage which the Rigel System planetarian might snatch could alter the nature of their relatinship? Was it because he just couldn't imagine Glugun assuming a gloating, superior attitude?

It wasn't so much the really bad things about themselves that humans kept from one another. It was all the little, fleeting mean thoughts and inane thoughts which surged through their minds in a continuous stream from dawn to dusk. All humans were zanies in their thoughts, but that was all right so long as nobody got caught with his mental pants down.

If you were feverish and babbled, or became intoxicated and babbled, you were just out of luck. Humans lived and breathed and had their beings behind a triple-plied barrier of deceit, a smokescreen which had to be maintained, or else—

Even the little ridiculous posturings which *all* humans struck in the privacy of their homes couldn't be exposed to public view without provoking mirth, astonishment or a lifting of eyebrows. That inane little song you sang while shaving. Suppose you had to repeat it before an audience? Or the way you hogged your food when you thought no one was looking.

Or the time you spanked the cat, not cruelly, but a little more vigorously than the offense warranted,



and with appropriate expletives. Or the scribblings you made on the margins of a book while waiting for a shuttle-plane—meaningless little curlicues with just enough symbolism in the twists and turns to damn you in the eyes of a psychiatrist.

With Glugun he just didn't feel that way. With Glugun there was no need for secrecy—

He was suddenly aware that the Rigel System planetarian was leaning sharply toward him. There was a bright and shining something in Glugun's taloned clasp, and the thin lips were moving.

"Now we shall feast in a different way. Stare steadily, and tell me what you see!'

The crystal cube was about eight inches square, and just holding it made Bosworth feel strange. It had passed so unobtrusively from Glugun's clawlike hands to his own trembling ones that it was hard for him to realize he was staring into it with an insistence that seemed to pluck at his eyeballs and draw his vision down—and down.

"Stare steadily," he heard Glugun reiterating, as though from a great distance.

At first there was nothing but a milky opacity in the depths of the cube. Then the milkiness cleared a little and he saw—something that glittered. The cube grew brighter, and the glitter resolved itself into a line of metal-sheeted poles, very tiny and far away, as though he were staring down at them through the wrong end of a telescope.

For a fractional second Bosworth thought that his temples would burst. Standing in front of the compound, shading her eyes, was a tiny human figure. There was no longer any opacity inside the cube, and he could see the sunlight glinting in Joan Mallory's hair, and the thin film of dust which had swirled up about her knees. After a moment Griscom came clumping out to stand beside her.

Bosworth squeezed the cube between his palms, and as he did so it seemed to contract a little. He could make out the girl's troubled frown, the tilt of Griscom's pipe. The girl's head was sun-aureoled, and a thin ribbon of smoke—he wrinkled his nose—was arising from the bowl of Griscom's pipe into the moist-dry air.

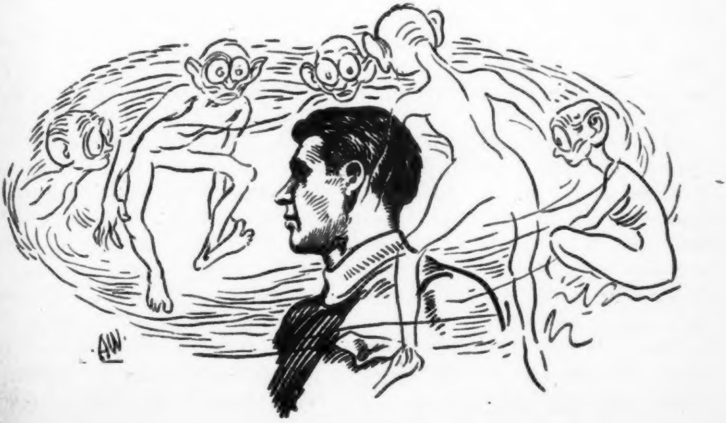
Suddenly Joan Mallory moved her head a little, and her brow seemed to take on a deeper redness, as though a crimson desert flower had blossomed in the tangled wilderness of her hair.

"Draw them closer, draw them toward you!" a far-off voice urged.

It wasn't difficult; it was not even necessary for Bosworth to increase the intensity of his stare. About the two tiny figures there had crept a translucent glimmering, and they swayed in it like—the image came unbidden into his mind—two minikin corpses afloat in a luminous tide.

Abruptly as he stared the stockade seemed to recede, and they were swirling up toward him over a tilted plain. Larger they grew and larger, swirling up as though propelled by an invisible wind. They hardly seemed to move their limbs as they drew near, and their faces were no longer mobile.

Suddenly they were quite astonishingly large, as though a magnification had taken place inside the cube. Their eyes were closed, and they appeared to be asleep. There was a pulsing at the girl's temples, and a brightening



and a dimming of the glowing dottle in Griscom's pipe.

He saw them for an instant and then—he didn't see them. His faculties seemed to expand, and into him there swept a vitality such as he had never known. He wasn't staring into the cube any more. He wasn't staring at anything at all.

There was a darkness in his brain—a vast, tumultuous pulsing which filled him with a soaring sense of power. The darkness and the pulsing were like a carousal. Winey was the darkness, bubbling and intoxicating, and with all his senses he drank deep of it until his temples swelled and something seemed to burst in his brain.

When he opened his eyes he seemed to be outside his own body. Remote and cold his body seemed—no longer a part of himself. He could look down over his drawn-up legs, could see also his hands which were folded in front of him. But a gray opacity swirled where his chest should have been, and he felt that he could not move his head. There was a sucked-in feeling about his eyes, and he couldn't—seem to—blink them.

Then he saw Glugun. The Rigel System planetarian was slumped down opposite him, his spindly legs drawn up grasshopper fashion on both sides of his thin body, his anemonelike egestive orifice concealed by the cube which he was clasping to his chest with rigidly contracted talons. His eyes were lidded and upon his owlish face there was a slumberous expression.

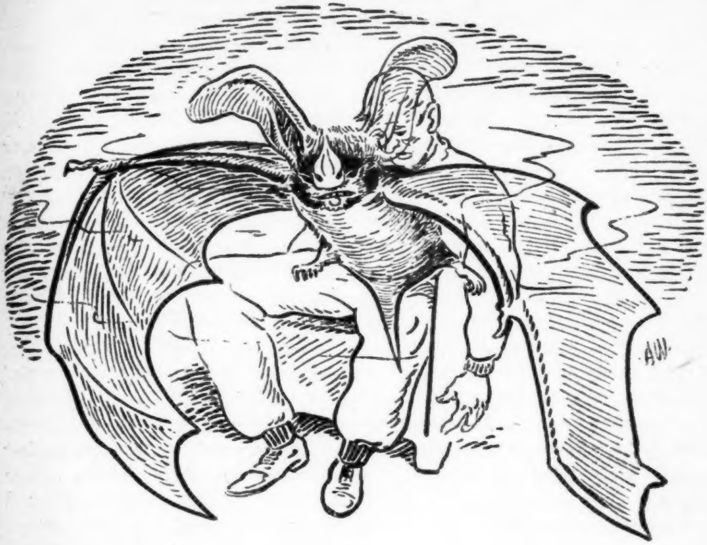
Bosworth thought he knew what his mind had done to the minikins in the crystal. He was a bright boy—bright enough to pry out the ghastly rind of the fruit which Glugun had offered him. He'd taken a mental bite, and it had—intoxicated him. Glugun had then snatched the cube back, and was now intoxicated himself.

Cold sweat oozed out on Bosworth's brow, and his teeth came together. He'd feasted on—human vital energies? Astral images? Occultism? Vampirism? On Terra crystal spheres and cubes were associated with the trappings of occultism. But on a Rigel sun planet—

Might there not be something entirely physiological in the human body, some as yet undetected vital emanation which could be trapped and imprisoned? If the cube were a kind of magnetized flytrap, composed of matter so sensitized it could absorb protoplasmic auras, and release them to a mind craving nourishment—

He stopped, appalled by the direction his thoughts were taking. Were the trappings and legends of occultism—crystal balls, abnormal mental states, the vampire and werwolf myths—simply the expression of a kind of psychic cannibalism, innate in humanity, but denied fulfillment on Terra, and groping blindly for the right answer?

Humans fashioned little wax figurines and pierced them with nails. Humans looked into crystals. An organism would be innate but unsatisfied craving would be guided



by intuition, for evolution had a mysterious way of transforming blind drives into hunches.

Was the crystal cube which Glugun was now clasping something which humans had always longed to clasp? Had the Rigel System planetarians the same urge, and worked out a scientific means of gratification?

With considerable effort Bosworth fought back a desire to retch. He was back inside his body now. He couldn't move his limbs yet, but he could see his chest, blink his eyes, and corporeality had returned to his stomach.

How long had Glugun slept, he wondered wildly. How long had *he* slept. Seven hours—ten? Beyond the open door of the hut there was now a redness, as though the dry air outside had caught fire, and—

Bosworth's thoughts congealed. The Rigel System planetarian had changed his position. He had lowered the cube and was leaning sharply forward, and out of the owlish face two slitted eyes were parrying Bosworth's stare with unmistakable derision.

In the spherical control room of the sidereal cruiser Joan Mallory's coppery hair seemed to set up a blaze.

"You should have told him the truth," she said, raising her voice to make herself heard above the droning of the atomotors. "He didn't know what he was letting himself in for."

"He knows now," Griscom grunted, drawing on his pipe, and staring out through the viewpane across a wet-dry plain that was already a blur in the wake of the thrumming vessel.

There was nothing out there he was sorry to be bidding good-by to, he told himself savagely. Six company sheds, smoldering in dry rot. Three smoldering in wet. The metal-sheeted posts of the stockade, mottled green and pink. Eighteen wasted months, receding like spectral horsemen over the hump of the plain. He'd know what to say to anyone who tried to claim you couldn't visualize a month. He'd have an answer ready.

He swung about with an angry gesture. "Why should I have alarmed him with a lot of vague suspicions. I've been getting weaker for months and you've been feeling it, too. They have a crystal cube, and when I looked into it I saw you. That's absolutely all I know. I fell into a drugged sleep and when I woke up I felt . . . all right, I'll say it . . . sluggish and all warm inside like a satiated vampire bat."

Griscom drew on his pipe. "I didn't feel like a Dracula in the flesh, you understand. It wasn't as gross as that. But—ta-ra-ra boom-de-ay. Sing it out loud and I don't see how it can add up to anything but a kind of mental vampirism."

"Yes, I think so," the girl agreed.

"You want to know why I didn't warn him. I'll tell you. He happens to be the youngest son of the President of the Intergalactic Trading Co. He's an ambitious young whelp, and he wanted to prove to papa he could make good on his own. If I'd laid my cards on the table, a realistic report telling the truth about a planet is the one thing I couldn't have wheedled out of him. He *had* to see for himself. He had to think he was improving our chances of pulling urns of beaten gold out of a very rank hat."

The girl looked at him. "You mean he had to be a guinea pig," she said. "That's what you mean, isn't it?"

Griscom reddened. "He got back all right, didn't he? He's safe on his bunk in the cuddy, isn't he? A bit white around the gills, but safe. I tell you, I had to make sure the post will stay abandoned. Now that he's actually seen what's inside the hat he'll back me to the hilt. The company won't just pigeonhole my report, and send another proctor out."

Griscom strode to the control board and studied the estimator. He manipulated a rheostat. He tested the synchronization of the automatic drive controls with a wet thumb and forefinger.

Then it came: "When I was a kid, we had a pirate's den in the backyard. We hung toy effigies from the yardarm of a little wooden ship. But when I grew up I put such things behind me. Rigel System planetarians may not be criminals. They may simply have failed to grow up."

Joan said slowly: "Just what does that mean?"

"Nothing, except that I'd rather live in a six by eight room with an Irrawaddy cobra."

The girl directed a startled glance at Griscom's stooped shoulders. "Jim, I thought you were a thoroughgoing materialist. If the crystals—"

Griscom straightened heavily. "The crystals are dangerous, but not in the way you think. Any bright and shining object would be dangerous—if *you had what it takes.*"

He nodded. "It's as clear as a pikestaff. When the vision becomes fixed on a bright and shining object the subconscious leaps into the saddle, and believes everything it's told. There is no actual outside compulsion—people hypnotize themselves. But if the operator had telepathic powers, and could get *inside* our minds—"

Griscom's face was grim. "Hypnosis might not be a self-induced state at all. Look at it this way. There may be something in the human mind which can be—manipulated. A kind of inhibiting sixth sense, perhaps, a faculty which keeps us from hopscotching it back down the shoreline into the pelagic muck. Perhaps that faculty, that inhibiting something can be *filched.*"

"Filched?"

Griscom nodded. "You know what filch means—petty pilfering, the sly taking away of something that's not likely to be missed. Apparently Rigel System planetarians can drain organic vital energies from a distance, and most effectively, perhaps, with the aid of a shining object. Perhaps if our brains were properly manipulated we could, too. Telepathic hypnosis, however induced, should be potent and pervasive enough to overcome an evolutionary quirk."

"Jim!"

Griscom frowned. "It would be an extra-sensory faculty, of course. But it could go back to a very early form of terrestrial life. For all we know even unicellular organisms may have extra-sensory endowments. Long ages ago some lowly form of life may have acquired the power and handed it on to us. Cilio-telepathy. Some primitive Cambrian-sea jelly, perhaps,

Pepsi-Cola
Pepsi-Cola

TOPS FOR QUALITY

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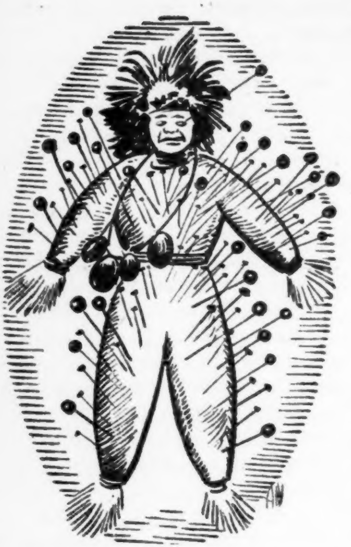


or a fleshy, fat worm with a blood-red proboscis. But such a power would have to be sidetracked, or the species would end by destroying itself. So natural selection built up a barrier, an inhibiting sixth sense—"

"Just a minute, Jim!" Joan was pressing her palms to her temples. "I don't feel I can stand any more. I don't believe it, it's too revolting, I . . . Jim, why did you have to talk about it? Why couldn't you have left it the way it was?"

Griscom looked at her for a long time. "Nothing nature does or fails to do should surprise you," he said. "Her sins of commission are bad enough, but her sins of omission—" His voice sharpened and became tinged with rancor, as though he were airing a grievance. "Half blind she is, a lazy and unscrupulous strumpet, but she never fails to pocket the tip, and walk off with her chin in the air. With just a little extra trouble she could have doubled our life spans, given us telescopic vision—or microscopic, for that matter—and a much richer enjoyment of scents."

Bosworth sat up. There was a dryness in his throat, and his brain was ticking like a clock. He tried to go to sleep, but sleep wouldn't come. Now he wasn't trying any more. Now he was only interested in stopping the shaking of his limbs, and getting the cobwebs out of his brain.

With a shudder he moved to the edge of the berth and felt around with his bare toes for his slippers on the thrumming deck. He couldn't sleep because certain memories were much too fresh in his mind. But by tomorrow or the next day they'd begin to recede, to shrink and shrivel up, and he wouldn't have to keep reminding himself he was in danger of cracking up.

He was going to be all right. When he poured himself a stiff one the cobwebs which kept creeping under his eyelids would cease to trouble him. There just wouldn't be any cobwebs and he might feel calm enough to make out a report backing Griscom to the hilt. If he couldn't sleep, writing steadily would help to calm his nerves, and—

He had only a confused recollection of descending to the deck, lurching across the cuddy and flinging open the metal cabinet which stood against the opposite bulkhead. But that he had stooped and reached inside the cabinet he could not doubt, for he suddenly found himself pouring amber fluid into a glass that mirrored his face in all its haggardness.

Although the cobwebs were creeping under his eyelides again he could see the glass clearly. His hand had trembled a little, and a thin film of spilled fluid encircled the glass. In the cold light from the lamp-studded overhead the deep-toned Scotch had a very pleasing aspect.

He grasped the edge of the cabinet and stared down as though fascinated.

At first there was nothing but a weaving opacity in the depths of the glass. Then the filminess cleared a little, and he saw something that glittered. The glass grew brighter and the glitter resolved itself into a gleaming control panel, very small and far away, as though he were staring down at it through the wrong end of a telescope.

Standing in front of the panel was a tiny human figure. There was no longer any opacity inside the cube, and he could see the cold light glinting in Joan Mallory's hair.

Bosworth's temples tightened, and his eyes began to shine.

THE END.

IN TIMES TO COME

Coming up next month is "Dead Hand," Isaac Asimov's latest Foundation story. The Foundation series has followed the rise of the Encyclopedia Foundation from its wild-goose chase of a publication of all knowledge, to the days of the Traders, working in the revolting kingdoms at the fringe of the dying Galactic Empire. Once the Foundation was threatened with conquest by local kingdoms—and smart leaders saved them, by playing one kingdom against the other. Again it was threatened by local kingdoms—and smart leaders, using the cult they had set up, saved it. Then it was threatened by the dying Empire, when one of the governors of that volume of the Empire tried to bring it under his control. Again, Foundation won—by simply waiting.

But what if a strong, clever general, commanding the forces of the still-vast, still-mighty Empire, during a period of resurgence under a strong, clever Emperor, attacks Foundation during a time when the Foundation leaders all happen to be weak, stupid, and bewildered? Under such conditions, obviously, Foundation will be—*the winnah!*

Think not? It's a rather astonishing sort of set-up, but follow it through—follow it through! It adds up, and Asimov's right. The stupidly led, small, weak, Foundation cannot be conquered even when the mighty Empire's forces, under a strong, clever general, with a strong, clever Emperor at home, attacks!

Cockeyed? Uh-huh. People always have been—

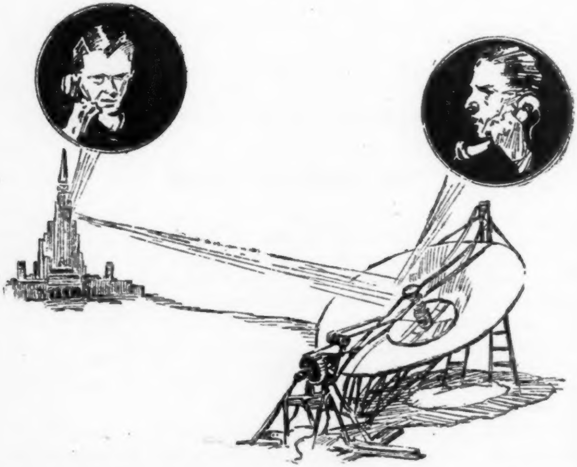
THE EDITOR.

Special Delivery

by GEORGE O. SMITH

The Venus Equilateral boys figured the matter transmitter they'd devised sent intelligence—information—and so belonged to V.E. But Kingman said matter was energy, and energy transmission rights were his. And, curiously, it wasn't a crooked judge that settled it, but a judge's crooked—but very!—watch!

Illustrated by Kramer



Don Channing grinned at his wife knowingly. Arden caught his glance and then laughed. Walt Franks leaned back and looked highly superior. "Go ahead and laugh, darn you. I tell you it can be done."

"Walt, ever since you tried that stunt of aerating soap with hydrogen to make a floating soap for shower baths, I've been wondering about your kind of genius."

"Oh no," objected Arden.

"Well, he wondered about it after nearly breaking his neck one morning."

"That I did," grinned Walt. "It's still a good idea."

"But the idea of transmitting matter is fantastic."

"Agreed," admitted Walt. "But so is the idea of transmitting power."

"It would come in handy if possible," remarked Don. "At slightly under 2-G, it takes only four hours to make Luna from Terra. On the other hand, shipping stuff from Melbourne, Australia, to New York City, or to the Mojave Spaceport takes considerably longer. With spacecraft as super stratosphere carriers it isn't too good, because you've got to run in a circle. In space you run at constant acceleration to mid-point and then decelerate the rest of the way. Fine for mile-eating, but not too hot for cutting circles."

"Well, having established the need of a matter transmitter, now what?"

"Go on, Walt. You're telling us."

"Well," said Walt, penciling some notes on the tablecloth, "it's like this. The Carroll-Baler power-transmission tube will carry energy. According to their initial experiments, they had some trouble."

"They had one large amount, if I recall."

"Specifically, I recall the incident of the hammer. Remember?"

"Barney Carroll got mad and swung a hammer at the tube, didn't he?"

"It was one of them, I don't recall which."

"No matter of importance," said Don. "I think I know what you mean. He hit the intake end—or tried to. The hammer was cut neatly and precisely off, and the energy of the blow was transmitted, somehow, to the wall."

"Through the wall," corrected Walt. "It cracked the plaster, but it went through so fast that it merely cracked it. The main blow succeeded in breaking the marble facade of the city hall."

"Um. Now bring us up to date. What have you in mind?"

"A tube which scans matter atom by atom, line by line, and plane by plane. The matter is removed, atom by atom, and transmitted to a sort of matter bank in the instrument."

"A what?"

"Matter bank," said Walt. "We can't transmit the stuff itself. That's out. We can't dissipate the atomic energy or whatever effect we might get. We can establish a balance locally by using the energy release to drive the restorer. According to some initial experiments, it can be done. We take something fairly complex and break it down. We use the energy of destruction to re-create the matter in a bank, or solid block of local stuff. Let it be a mass of stuff if it wants to, at any rate, the signal impulses from the breakdown will be transmitted, scanned, if you will, and transmitted to a receiver which reverses the process. It scans, and the matter bank is broken down and the object is rebuilt.

"I hope we can get free and unrestricted transmutation," offered Don. "You can't send a steel spring out and get one back made of copper."

"I get your point."

"The space lines will hate you," said Arden.

"Too bad. I wonder if it'll carry people."

"Darling," drawled Arden, "don't you think you'd better catch your rabbit first?"

"Not too bad a thought," agreed Don. "Walt, have you got any rabbit traps out?"

"A couple. I've been tinkering a bit. I know we can disintegrate matter through a power tube of slight modification, and reintegrate it with another. At the present state of the art, it is a mess."

"A nice mess," laughed Don. "Go ahead, though. We'll pitch in when the going gets hard."

"That's where I stand now. The going is tough."

"What's the trouble?"

"Getting a perfect focus. I want it good enough so that we can scan a polished sheet of steel—and it'll come out as slick as the original."

"Naturally. We'd better get Wes Ferrell on the job."

"I wonder what by-product we'll get this time."

"Look, Walt. Quit hoping. If you get this thing running right, it'll put your name in history."

"After all," grinned Walt, "I've got to do something good enough to make up for that Channing Layer."

"Kingman is still fuming over the Channing Layer. Sometimes I feel sorry that I did it to him like that."

"Wasn't your fault, Don. You didn't hand him the thing knowing that the Channing Layer would inhibit the transmission of energy. It happened. We get power out of Sol—why shouldn't they? They would, except for the Channing Layer."

"Wonder what your idea will do."

"About the Channing Layer? Maybe your space-line competition is not as good as it sounds."

"Well, they use the power-transmission tubes all over the face of the Solar System. I can't see any reason why they couldn't ship stuff from Sidney to Mojave and then space it out from there."

"What an itinerary! By Franks' matter transmitter to Mojave. Spacecraft to Luna. More matter transmission from Luna to Phobos. Then transshipped down to Lincoln Head, and by matter transmitter to Canalopsis. *Whoosh!*"

"Do we have time to go into the old yarn about the guy who listened in and got replicas?" asked Arden.

"That's a woman's mind for you," grinned Channing. "Always making things complicated. Arden, my lovely but devious-minded woman, let's wait until we have the spry beastie by the ears before we start to make rabbit pie."

"It's not as simple as it sounds," warned Walt. "But it's there to worry about."

"But later. I doubt that we can reason that angle out."

"I can," said Arden. "Can we tap the power beams?"

"Wonderful is the mind of woman!" praised Don. "Positively wonderful! Arden, you have earned your next fur coat. Here I've been thinking of radio transmission all the time. No, Arden, when you're set up for sheer energy transmission, it's strictly no dice. The crimped-up jobs we use for communications can be tapped—but not the power-tranasmission beams. If you can keep the gadget working on that line, Walt, we're in and solid."

"I predict there'll be a battle. Are we shipping energy or communications?"

"Let Kingman try and find a precedent for that. Brother Blackstone himself would be stumped to make a ruling. We'll have to go to work with the evidence as soon as we get a glimmer of the possibilities. But I think we have a good chance. We can diddle up the focus, I'm certain."

Arden glowered. "Go ahead—have your fun. I see another couple of weeks of being a gadgeteer's widow." She looked at Walt Franks. "I could stand it if the big lug only didn't call every tool, every part, and every effect either *she* or *baby!*"

Walt grinned. "I'd try to keep you from being lonely, but I'm in this too, and besides, you're my friend's best wife."

"Shall we drag that around a bit? I think we could kill a couple of hours with it sometime."

"Let it lie there and rot," snorted Channing cheerfully. "We'll pick it up later. Come on, Walt. We've got work to do."

Mark Kingman glowered at the 'gram and swore under his breath. He wondered whether he might be developing a persecution complex; it seemed as though every time he turned around, Venus Equilateral was in his hair, asking for something or other. And he was not in any position to quibble about it. Kingman was smart enough to carry his tray very level. Knowing that they were waiting for a chance to prove that he had been connected with the late Hellion Murdoch made him very cautious. There was no doubt in any mind that Murdoch was written off the books. But whether Murdoch had made a sufficiently large impression on the books of Terran Electric to have the connection become evident—that worried Kingman.

So he swore at each telegram that came in, and then sent the desired object out with the next ship. Compared to his former attitude toward Venus Equilateral, Mark Kingman was behaving like an honor student in a Sunday school.

Furthermore, behaving himself did not make him feel good.

He punched the buzzer, told his secretary to call in the shop foreman, and then sat back and wondered about the 'gram.

He was still wondering when the man entered. Kingman looked up and fixed his superintendent with a fish glance. "Horman, can you guess why the Venus Equilateral crowd would want two dozen gauge blocks?"

"Sure. We use Johannson Blocks all the time."

"Channing wants twenty-four blocks. All three inches on a side—cubes. Square to within thirty seconds of angle, and each of the six faces optically flat to one quarter wave length of Cadmium light."

"*Whoosh!*" said Horman. "I presume the three-inch dimension must be within a half wave length?"

"They're quite lenient," said Kingman bitterly. "A full wave length!"

"White of them," grunted Horman. "I suppose the same thing applies?"

"We're running over thin ice," said Kingman reflectively. "I can't afford to play rough. We'll make up their blocks."

"I wonder what they want 'em for."

"Something tricky, I'll bet."

"But what could you use two dozen gauge blocks for? All the same size."

"Inspection standards?" asked Kingman.

"Not unless they're just being difficult. You don't put primary gauges on any production line. You make secondary gauges for production line use and keep a couple of primaries in the check room to try the secondaries on. In fact, you usually have a whole set of gauge blocks to build up to any desired dimension so that you don't have to stock a half-million of different sizes."

"It's possible that they may be doing something extremely delicate?"

"Possible," said Horman slowly. "But not too probable. On the other hand, I may be one hundred percent wrong. I don't know all the different stuff a man can make, by far. My own experience indicates that nothing like that would be needed. But that's just one man's experience."

"Channing and that gang of roughneck scientists have been known to make some fancy gadgets," said Kingman grudgingly.

"If you'll pardon my mentioning the subject," said Horman in a scathing tone, "you'd have been far better off to tag along with 'em instead of fighting 'em."

"I'll get 'em yet!"

"What's it got you so far?"

"I'm not too bad off. I've come up from the assistant chief legal counsel of Terran Electric to controlling the company."

"And Terran Electric has slid down from the topmost outfit in the system to a seventh rater."

"We'll climb back. At any rate, I'm better off personally. You're better off personally. In fact, everybody that had enough guts to stay with us is better off."

"Yeah—I know. It sounds good on paper. But make a bum move again, Kingman, and we'll all be in jail. You'd better forget that hatred against Venus Equilateral and come down to earth."

"Well, I've been a good boy for them once. After all, I did point out the error in their patent on the solar beam."

"That isn't all. Don't forget that Terran Electric's patent was at error too."

"Frankly it was a minor error. It's one of those things that is easy to get caught on. You know how it came about?"

"Nope. I accepted it just like everybody else. It took some outsider to laugh at me and tell me why."

Kingman smiled. "It's easy to get into easy thinking. They took power from Sirius—believe it or not—and then made some there-and-back time measurements and came up with a figure that was about the square of one hundred eighty-six thousand miles per second. But you know that you can't square a velocity and come up with anything that looks sensible. The square of a velocity must be some concept like an expanding area."

"Or would it be two spots diverging along the sides of a right angle?" queried Horman idly. "What was their final answer?"

"The velocity of light is a concept. It is based on the flexibility of space—its physical constants, so to speak. Channing claims that the sub-etheric radiation bands of what we have learned to call the driver radiation propagates along some other medium than space itself. I think they were trying to establish some mathematical relation—which might be all right, but you can't establish that kind of relation and hope to hold it. The square of C in meters comes out differently than the square of C in miles, inches, or a little-used standard, the light-second, in which the velocity of light is unity, or One. Follow? Anyway, they made modulation equipment of some sort and measured the velocity and came up with a finite figure which is slightly less than the square of one hundred eighty-six thousand miles per second. Their original idea was wrong. It was just coincidence that the two figures came out that way. Anyway," smiled Kingman, "I pointed it out to them and they quick changed their patent letters. So, you see, I've been of some help."

"Nice going. Well, I'm going to make those gauges. It'll take us one long time, too. Johannson Blocks aren't the easiest thing in the world to make."

"What would you make secondary standards out of?"

"We use glass gauges, mostly. They don't dinge or bend when dropped—they go to pieces or not at all. We can't have a bent gauge rejecting production parts, you know, and steel gauges can be bent. Besides, you can grind glass to a half wave length of light with ease, but polishing steel is another item entirely."

"I'm going to call Channing and ask him about glass blocks. It may be that he might use them. Plus the fact that I may get an inkling of the ultimate use. They have no production lines running on Venus Equilateral, have they?"

"Nope. Not at all. They're not a manufacturing company."

"Well, I'm going to call."

Kingman's voice raced across Terra to Hawaii, went on the communications beams of the sky-pointing reflectors, and rammed through the Heaviside Layer to Luna. At the Lunar Station, his voice was mingled in multiplex with a thousand others and placed on the subether beams to Venus Equilateral.

Don Channing answered the 'phone. "Yes?"

"Kingman, Dr. Channing."

Don grunted. He did not care to be addressed by title when someone who disliked him did it. His friends did not, and Kingman's use of the title made it an insult.

"Look," said Kingman, "what do you want to use those blocks for?"

"We've got a job of checking dimensions."

"Nothing more? Do you need the metal for electrical reasons?"

"No," said Don. "What have you in mind?"

"Our toolshop is nicely equipped to grind glass gauges. We can do that better than making Jo-blocks. Can you use glass ones?"

"Hang on a minute." Channing turned to Walt. "Kingman says his outfit uses glass gauges. Any reason why we can't?"

"See no reason why not. I've heard of using glass gauges, and they've got some good reasons, too. Tell him to go ahead."

"Kingman? How soon can we get glass ones?"

"Horman, how soon on the glass blocks?"

"Two dozen? About a week."

"We'll have your blocks on the way within four days, Channing. Four days minimum, plus whatever wait is necessary to get 'em aboard a spacer."

"We'll check from this end on schedules. We need the blocks, and if the wait is too long, we'll send the *Relay Girl* in for 'em."

Don hung up and then said: "Glass ones might be a good idea. We can check the transmission characteristics optically. I think we can check more, quickly, than by running analysis on steel."

"Plus the fact that you can get the blocks back after test," grinned Walt. "Once you tear into a steel block to check its insides, you've lost your sample. I don't know any other way to check the homogeneity than by optical tests."

"O.K. Well, four days for glass will do better than a couple of months on steel blocks."

"Right. Now let's look up Wes and see what he's come up with."

They found Farrell in one of the blister laboratories, working on a small edition of the power-transmission tubes. He was not dressed in spacesuit, and so they entered the blister and watched him work.

"Have a little trouble getting the focus to stay sharp through the trace," complained Wes. "I can get focus of atomic proportions—the circle of confusion is about the size of the atom nucleus, I mean—at the axis of the tube. But the deflection of the cone of energy produces aberration, which causes coma at the edges. The corners of an area look fierce."

"I wonder if mechanical scanning wouldn't work better."

"Undoubtedly. You don't hope to send life, do you?"

"It would be nice—but no more

fantastic than this thing is now. What's your opinion?”

Wes loosened a set screw on the main tube anode and set the anode forward a barely perceptible distance. He checked it with a venier rule and tightened the screw. He made other adjustments on the works of the tube itself, and then motioned outside. They left the blister, Wes closed the airtight, and cracked the valve that let the air out of the blister. He snapped the switch on the outside panel and then leaned back in his chair while the cathode heated.

“With electrical scanning, you'll have curvature of field with this gadget. That isn't too bad, I suppose, because the restorer will have the same curvature. But you're going to scan three ways, which means correction for the linear distance from the tube as well as the other side deflections and their aberrations. Now if we could scan the gadget mechanically, we'd have absolute flatness of field, perfect focus, and so forth.”

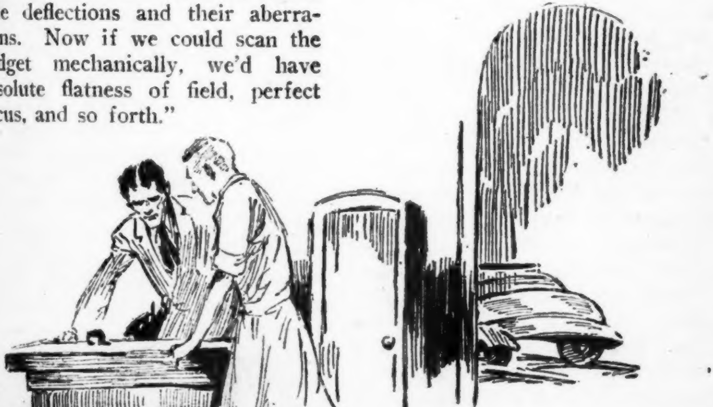
Walt grinned. “Thinking of television again? Look, bright fellows, how do you move an assembly of mechanical parts in quanta of one atomic diameter? They've been looking for that kind of gadget for centures. Dr. Rowland and his gratings would turn over in their graves with a contrivance that could rule lines one atom apart.”

“On what?” asked Don.

“If it would rule one atom lines, brother, you could put a million lines per inch on anything rulable with perfection, ease, eclat, and savoir faire. You follow my argument? Or would you rather take up this slip of my tongue and make something out of it?”

“O.K., fella. I see your point. How about that one, Wes?”

Wes Farrell grinned. “Looks like I'll be getting perfect focus



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with the electrical system here. I hadn't considered the other angle at all, but it looks a lot tougher than I thought."

He squinted through a wall-mounted telescope at the set-up on the inside of the blister. "She's hot," he remarked quietly, and then set to checking the experiment. Fifteen minutes of checking, and making notes, and he turned to the others with a smile. "Not too bad that way," he said.

"What are you doing?"

"I've established a rather complex field. In order to correct the aberrations, I've got nonlinear focusing fields in the places where they tend to correct for the off-axis aberration. To correct for the height-effect, I'm putting a variable corrector to control the whole cone of energy, stretching it or shortening it according to the needs. I think if I use a longer focal length I'll be able to get the thing running right.

"That'll lessen the need for correction, too," he added, cracking the blister-intake valve and letting the air hiss into the blister. He opened the door and went inside, and began to adjust the electrodes. "You know," he added over his shoulder, "we've got something here that might bring in a few dollars on the side. This matter-bank affair produces clean, clear, and practically pure metal. You might be able to sell some metal that was rated 'pure' and mean it."

"You mean absolutely, positively, guaranteed, uncontaminated, unadulterated, perfectly chemically pure?" grinned Don.

"Compared to what 'Chemically Pure' really means, your selection of adjectives is a masterpiece of understatement," laughed Walt.

"I'm about to make one more try," announced Wes. "Then I'm going to drop this for the time being. I've got to get up to the machine shop and see what they're doing with the rest of the thing."

"We'll take over that if you wish," said Don.

"Will you? I'll appreciate it. I sort of hate to let this thing go when I feel that I'm near an answer."

"We'll do it," said Walt. "Definitely."

They left the laboratory and made their way to the elevator that would lift them high into the Relay Station where the machine shop was located. As they entered the elevator, Don shook his head.

"What's the matter?"

"Well, Friend Farrell is on the beam again. If he feels that we're close to the answer, I'll bet a hat that we're hanging right on the edge. Also, that kind of work would kill me dead. He likes to stick on one thing until the bitter end, no matter how long it takes. I couldn't do it."

"I know. About three hours of this and you're wanting another job to clear your mind. Then you could tackle that one for about three hours and take back on the first."

"Trying to do that to Farrell would kill both him and the jobs," said Don. "But you and I can keep two or three projects going strong. Oh well, Wes is worth a million."

"He's the best we've got," agreed Walt. "Just because he has a peculiar slant on life is no sign he's not brilliant."

"It's you and I that have the cockeyed slant on life," grinned Don. "And frankly, I'm proud of it." He swung the elevator door aside and they walked down the corridor. "This isn't going to be much to see, but we'll take a look."

The machine shop, to the man, was clustered around the one cabinet under construction. They moved aside to permit the entry of Channing and Franks.

"Hm-m-m," said Don. "Looks like a refrigerator and incinerator combined."

It did. It stood five feet tall, three feet square, and was sealed in front by a heavy door. There was a place intended for the tube that Farrell was tinkering with in the blister, and the lines to supply the power were coiled behind the cabinet.

"Partly wired?" asked Don.

"Just the power circuits," answered Walton. "We'll have this finished in a couple of days more. The other one is completed except for Wes Farrell's section."

Channing nodded, and said: "Keep it going." He turned to Walt and after the passage of a knowing glance, the pair left. "Walt, this waiting is getting on my nerves. I want to go down to Joe's and drink myself into a stupor which will last until they get something cogent to work on."

"I'm with you, but what will Arden say?"

"I'm going to get Arden. Self-protection. She'd cut my feet off at the knees if I went off on a tear without her."

"I have gathered that," grinned Walt. "You're afraid of her."

"Yeah," drawled Don. "After all—she's the cook."

"I'm waiting."

"Waiting for what?"

"If and when. If you two go on as you have for another year without one of you turning up with a black eye, I may be tempted to go forth and track me down a dame of my own."

The cabinet stood in the north end of Venus Equilateral but it was not alone. It may even be the record for all times; certainly no other cabinet three by three by five ever had twenty-seven men all standing in a circle awaiting developments. The cabinet at the south end of Venus Equilateral was no less popular, though the number of watchers was less by one. Here, then, were winner and runner-up of inanimate popularity for the ages. The communicator system set in the walls of the two rooms carried sounds from the north room to the south, and those sounds in the south room could be heard in the north room. Channing grinned boyishly at Arden.

"This, my love, is a device which may make it quite possible for me to send you back to mother."

Arden smiled serenely. "No

dice," she said. "Mother went back to grandmother last week. When is this thing going to cook?"

"Directly."

"What are we waiting for?"

"Walt."

"I'm ready," came Walt's voice through the speaker.

"About time, slowpoke."

"Really, it was not his fault," objected Wes. "I wanted to check the scanner-synchronization."

"He's precious," chortled Arden in Don's ear. "He wouldn't think of letting Walt—the big bum—take the blame for anything that wasn't Walt's fault."

"That's a good line," grinned Don. "Walt's faults. After we set this thing aside as a finished project, we'll set that 'Walt's faults' to music. Ready, Walt?"

"Right. I am now slipping the block into the cabinet. The door is closed. Have you got the preliminary synchronizing signal in tick?"

Channing called: "Wait a minute, I'm lagging a whole cycle."

"Cut your synchronization input and let the thing catch up."

"O. K. Um-m-m— Now, Walt."

"Has anyone any last words to say?" asked Walt.

No answer.

"Then since no one has any objections at this time, I assume that everything may be run off. Silence, people, we are going on the air!"

"There was a very faint odor of corn in Walt's last remark," said Don.

"I think the corn was on his breath," said Arden.

"Done!" announced Walt. "Don, crack the door so that the rest of us can laugh if it don't work."

Channing swaggered over and opened the door. He reached inside and took out the—object.

He held it up.

"Walt," said he, "what are you giving me?"

"Huh?"

"I presume that you shipped me one of the cubes?"

"Right."

"Well, what we got at this end would positively scare the right arm off of a surrealist sculptor."

"Hang on to it—I'll be up."

"Hang on to it?" laughed Don. "I'm afraid to."

It was three miles from one end of Venus Equilateral to the other and Walt made it in six minutes from the time he stepped into the little runaway car to the time he came into the north-end laboratory and looked over Channing's shoulder at the—thing—that stood on the table.

"Um," he said. "Sort of distorted, isn't it?"

"Quite," said Don. "This is glass. It was once a three-inch cube of precision, polish, and beauty. It is now a combination of a circular stairway with round corners and a sort of accordian pleat. Hell's bells!"

"Be not discouraged," gurgled Walt. "No matter what it looks like, we did transmit matter."

Arden tapped Don on the shoulder. "May I say it now?"

"You do—!"

"Then I won't say it doesn't matter."

"I'm ignoring your crude remark. Walt, we did accomplish something. It wasn't too good. Now let's figure out why this thing seems to have been run over with a fourth dimensional caterpillar-tread truck."

"Well, I can hazard a guess. The synchronizing circuits were not clamped perfectly. That gives the accordion-pleat effect. The starting of the trace was not made at the same place each time due to slippage. We'll have to beef up the synchronization impulse. The circular staircase effect was probably due to phase distortion."

"Could be," said Don. "That means we have to beef up the transmission band so it'll carry a higher frequency."

"A lower impedance with corrective elements?"

"Might work. Those will have to be matched closely. We're not transmitting on a line, you know. It's sheer transmission-tube stuff from here to there. Well, gang, we've had our fun. Now let's widen the transmission band and beef up the sync. Then we'll try number two."

Number two was tried the following afternoon. Again, everybody stood around and watched over Don's shoulder as he removed the cube from the cabinet.

"Nice," he said, doing a little war dance.

Franks came in puffing, took the cube from Don's fingers and inspected it. "Not too bad," he said.

"Perfect."

"Not by a jug full. The index of refraction is higher at this edge than at the other. See? Walt held the cube before a newspaper and they squinted through the glass block.

"Seems to be. Now why?"

"Second harmonic distortion, if present, would tend to thin out one side and thicken up the other side. A sine-wave transmission would result in even thicknesses, but if second harmonic distortion is present, the broad loops at the top create a condition where the average from zero to top is higher than the average from zero to the other peak. Follow?"

"That would indicate that the distortion was coming in at this end. If both were even, they would cancel."

"Right. Your scanning at one end is regular—at the other end it is irregular, resulting in non-homogeneity."

"The corners aren't really sharp," objected Arden.

"That's an easy one. The wave-front isn't sharp either. Instead of clipping sharply at the end of the trace, the signal tapers off. That means higher frequency response is needed."

"We need a term. Audio for sonics; radio for electronics, video for television signals—"

"Mateo," said Arden.

"Um—sounds sort of silly," grinned Walt.

"That's because it's strange. Mateo it is," said Don. Our mateo amplifier needs higher frequency response in order to follow the square wave-front. Might put a clipper circuit in there, too."

"I think a clipper and sharpener will do more than the higher frequency," said Farrell. He was plying a vernier caliper, and he added: "I'm certain of that second harmonic stuff now. The dimension is cockeyed on this side. Tell you what, Don. I'm going to have the index of refraction measured within an inch of its life. Then we'll check the thing and apply some high-powered math and see if we can come up with the percentage of distortion."

"Go ahead. Meanwhile, we'll apply the harmonic analyzer to this thing and see what we find. If we square up the edges and make her homogeneous, we'll be in business."

"The space lines will hate you to pieces," said Arden.

"Nope. I doubt that we could send anything very large. It might be more bother to run a huge job than the money it costs to send it by spacer. But we have a market for small stuff that is hard to handle in space because of its size."

"I see no reason why Keg Johnson wouldn't go for a hunk of it," offered Wes Farrell.

"I've mentioned it to Keg; the last time I was in Canalopsis," said Walt. "He wasn't too worried—providing he could buy a hunk."

"Interplanet is pretty progressive," mused Don. "There'll be no reason why we can't make some real handy loose change out of this. Well, let's try again tomorrow."

"O. K. Let's break this up. Will we need any more blocks from Terran Electric?"

It was less than a month later that a newspaper reporter caught the advanced patent notice and swallowed hard. He did a double take, shook his head, and then read the names on the patent application and decided that someone was not fooling. He took leave and made the run to Venus Equilateral to interview the officials. He returned not only with a story, but with a sample glass block that he had seen run through the machine.

The news pushed one hatchet murder, a bank robbery, a football upset, and three political harangues all the way back to page seven. In terms more glowing than scientifically accurate, the matter transmitter screamed in three-inch headlines, trailed down across the page in smaller type, and was embellished with pictures, diagrams, and a description of the apparatus. The latter had been furnished by Walt Franks, and had been rewritten by the reporter because Walt's description was too dry.

The following morning Venus Equilateral had nine rush telegrams. Three were from cranks who wanted to go to Sirius and set up a restorer there to take people; four were from superstitious nuts who called Channing's attention to the fact that he was overstepping the rights given to him by his Creator; one was from a gentleman who had a number of ideas, all of which were based on the idea of getting something for nothing, and none of which were legal; and the last one was a rather curt note from Terran Electric, pointing out that this device came under the realm of the power-transmission tube and its developments and that they wanted a legal discussion.

"Have they got a leg to stand on?" asked Walt.

"I doubt it."

"Then to the devil with them," snapped Walt. "We'll tell 'em to go jump in the lake."

"Nope. We're going in to Terra and slip them the slug. If we clip them now, they'll have nothing to go on. If we wait until they get started, they'll have a fighting chance. Besides, I think that all they want to do is to have the facts brought out. Are we or are we not under the terms of that contract?"

"Are we?"

"We're as safe as Sol. And I know it. That contract pertained to the use of the Solar beam only, plus certain other concessions pertaining to the use of the power-transmission tubes and other basic effects as utilized in communications."

"Why can't we tell 'em that?"

"It's got to be told in a court of law," said Don. "Kingman's mind runs to legal procedure like Blackstone."

"We'll take the gadgets?"

"Right. What are you using for power?"

"What other? Solar beams, of course. We don't bother about running stuff around any more. We plug it in the 115-volt line, it energizes the little fellows just long enough to make them self-sustaining from Sol. All the 115-volt line does is to act as a starting circuit."

"You and Farrell had better dream up a couple of power supplies, then. We can't use the Solar beam on Terra."

"I know. We're a little ahead of you on that. Wes and one of the Thomas boys cooked up a beam-transducer power supply that will gets its juice from any standard 115-volt, sixty-cycle line socket. We've two of them—and they run the things easily."

"Good. I'll 'gram Terran Electric and let 'em know we're on our way for the legal tangle. You load up the *Relay Girl* and we'll be on our way. Stock up the usual supply of bars, blocks, gadgets, and traps. Might include a bar magnet. When we show that it is still magnetized, we'll gain a point for sure."

"If we take a magnet, we'd better take the fluxmeter to show that the magnetic field hasn't dropped."

"Right. Take anything you can think of for a good show. We can knock them dead!"

Mark Kingman put his assistant legal counsel on the witness stand. "You will state the intent of the contract signed between Terran Electric and Venus Equilateral."

"The contract holds the following intent: Use of the power-transmission tubes for communications purposes shall fall under the jurisdiction of Venus Equilateral. For power transmission, the tubes and associated equipment is under the control of Terran Electric. In the matter of the Solar beam tubes, the contract is as follows: Venus Equilateral holds the control of the

Solar beam in space, on man-made bodies in space, and upon those natural bodies in space where Venus Equilateral requires the Solar power to maintain subsidiary relay stations."

"Please clarify the latter," said Kingman. "Unless it is your intent to imply that Terra, Mars, and Mercury fall under the classification of 'places where Venus Equilateral requires power.'"

"Their control on natural celestial objects extends only to their own installations and requirements. Basically, aside from their own power requirements, Venus Equilateral is not authorized to sell power. In short, the contract implies that the use of the sub-etheric phenomena is divided so that Venus Equilateral may use this region for communications, while Terran Electric uses the sub-ether for power. In space, however, Venus Equilateral holds the rights to the Solar beam."

'Frank Tinkin, head legal man of Venus Equilateral holds the rights to the Solar beam."

Frank Tinkin, head legal man of Venus Equilateral, turned to Don and said: "We should have this in a technical court."

Don took his attention from the long discussion of the contract and asked: "Why not change?"

"Judges hate people who ask for change of court. It is bad for the requestee—and is only done when the judge is open to the question of disinterested—and also when the suspicion of dislike is less dangerous than the judge himself."

"Well, this should be in a technical court."

"Want to chance it?"

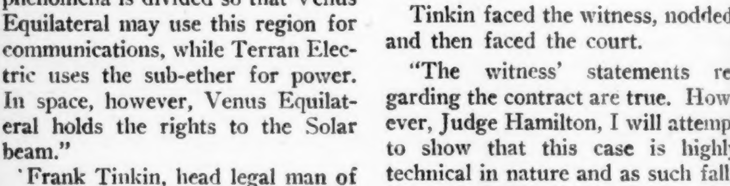
"I think so. This is more than likely to turn up with differential equations, physics experts, and perhaps a demonstration of atom-smashing."

Kingman finished his examination and turned away. The judge nodded sourly at Tinkin. "Cross-examination?"

Tinkin faced the witness, nodded, and then faced the court.

"The witness' statements regarding the contract are true. However, Judge Hamilton, I will attempt to show that this case is highly technical in nature and as such falls under the jurisdiction of the Technical Court. May I proceed?"

"Counsel for the plaintiff assures me that this is not truly a technical case," snapped Hamilton. "However if you can definitely prove that the case in point hinges on purely technical matters, what you say may



be instrumental in having this hearing changed. Proceed."

"Thank you." Tinkin turned to the witness. "Exactly what is the point in question?"

"The point in question," said the witness, "is whether or not the matter transmitter falls under Terran Electric's contract or Venus Equilateral's contract."

"Isn't the question really a matter of whether the basic effect is technically communication or power transmission?"

"Objection!" barked Kingman. "The counsel is leading the witness."

"Objection permitted—strike the question from the record."

"I was merely trying to bring out the technical aspect of the case," explained Tinkin. "I'll rephrase the question. Is it not true that the contract between Terran Electric and Venus Equilateral is based upon a certain technology?"

"Certainly."

"Then if the case is based on technical aspects—?"

"Objection!" marked Kingman. "More than half of all manufacturing contracts are based upon technical background. I quote the case of Hines versus Ingall in which the subject matter was the development of a new type of calculating machine. This case was heard in a legal court and disposed of in the same."

"Objection permitted."

"No further examination," said Tinkin. He sat down and turned to Don. "We're in trouble. Hamilton does not like us."

"Well, we still have the whip hand."

"Right, but before we get done we'll have trouble with Hamilton."

"Before we get done, Kingman will have trouble with us," said Don.

Terran Electric's lawyer called Wes Farrell to the stand. "Mr. Farrell, you are employed by Venus Equilateral?"

"Yes."

"In what capacity?"

"As an experimental physicist."

"And as such, you were involved in some phases of the device under discussion?"

"I was," said Farrell.

"Does the device make use of the Solar beam?"

"It does but—"

"Thank you," interrupted Kingman.

"I'm not through," snapped Farrell. "The Solar beam is not integral."

"It is used, though."

"It may be removed. If necessary, we can have hand-generators supplied to generate the operating power."

"I see," said Kingman sourly. "The device itself is entirely new and basic?"

"Not entirely. The main components are developments of existing parts, specialized to fit the requirements."

"They are based on specifically what?"

"Certain effects noted in the power-transmission tubes plus certain effects noted in the Solar beam tubes."

"And which of these effects is more contributory?"

"Both are about equally responsible. One will be useless without the other."

Kingman turned to the judge. "I intend to show that the use of these effects is stated in the contract."

"Proceed."

"Was there any time during the development of the device any question of jurisdiction?"

"None whatever," said Farrell. "We knew how we stood."

"The statement is hearsay and prejudiced," stated Kingman.

"Strike it from the record," snapped Hamilton.

"It stands at 'none whatever,' " said Kingman.

The secretary nodded.

"Since absolutely no attention was paid to the terms of the contract, doesn't that imply that a certain ignorance of the terms might prevail?"

"Objection!" shouted Tinkin. "Counsel's question implies legal carelessness on the part of his opponent."

"How can you be aware of the ramifications of a contract that you do not read?" stormed Kingman.

"Objection overruled."

"May I take exception?" requested Tinkin.

"Exception noted. Counsel, will you rephrase your question so that no lack of foresight is implied?"

"Certainly," smiled Kingman. "How were you certain that you were within your rights?"

"If this plan had been open to any question, my superiors would not have permitted me—"

"That will not serve!" snapped Kingman. "You are making an implication — your testimony is biased."

"Naturally," barked Farrell. "No one but an idiot would claim to have no opinion."

"Does that include the court?" asked Kingman suavely.

"Naturally not," retorted Farrell. "I was speaking of interested parties."

"Let it pass. In other words, Dr. Farrell, you were never sure that you were within your rights?"

"I object!" exploded Tinkin. "Counsel is questioning a witness whose business is not legal matters on a subject which is legal in every phase."

"Objection sustained," said Hamilton wearily. The matter was dropped, but Kingman had gained his point. The item may never appear in the records, but it was present in the judge's mind.

"Dr. Farrell," said Kingman, "since you have no legal training, precisely what has been your education and background?"

"I hold a few degrees in physics, one in mathematics, and also in physical chemistry." Farrell turned to the judge. "Judge Hamilton, may I explain my position here?"

"You may."

"I have spent thirteen years studying physics and allied sciences. I believe that I stand fairly high among my fellows. Since no man may be capable in many arts, I believe that I have not been lax in not seeking degrees in law."

"No objection," said Kingman. "Dr. Farrell, in order that the process be properly outlined in the record, I am going to ask you to explain it in brief. How does your matter transmitter work?"

Farrell nodded, and took time to think. Tinkin whispered in Don's ear: "The stinker! He knows Hamilton hates anything more complex than a can opener!"

"What can we do?"

"Hope that our demonstration blasts them loose. That's our best bet, plus fighting for every inch."

Farrell moistened his lips and said: "Utilizing certain effects noted with earlier experimentation, we have achieved the following effects. The matter to be transmitted is placed in situ, where it is scanned by an atom-scanner. This tube removes the substance, atom by atom, converting the atoms to energy. This energy is then reconverted into atoms and stored in a matter bank as matter again. The energy of disintegration is utilized in reintegration at the matter bank with but small losses. Since some atoms have higher energy than others, the matter bank's composition will depend upon the scanned substance."

"The matter bank is composed of the same elements as the matter for transmission?" asked Kingman.

"No. Some elements release more energy than others. It is desirable that the energy-transfer be slightly negative. That is to say that additional energy must be used in order to make the thing work."

"Why?"

"All power lines and other de-

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vices are developed for delivering energy, not receiving it. It is less disastrous to take energy from a power line than to try and drive it back in—and the energy must be dissipated somehow."

"Then the matter bank is not the same material."

"No," said Farrell. "The substance of the matter bank is nonhomogeneous. Instantaneously, it will be whatever element is necessary to maintain the fine balance of energy—and it is in constant change."

"Proceed," said Kingman.

"In passing from the disintegrator tube to reintegrator tube, the energy impresses its characteristic signal on a sub-ether transmission system. Radio might work, except that the signal is unbelievably complex. Wired communications—"

"Objection to the term," said Kingman.

"Sustained."

"Wired . . . transfer? . . . might work, but probably would not due to this same high complexity in transmitted signal. At any rate, upon reception, the signal is used to influence, or modulate, the energy passing from a disintegrator tube to a reintegrator tube in the receiver. But this time the tube is tearing down the matter bank and restoring the object. Follow?"

"I believe so. Does the Court understand?"

"This Court can follow the technical terms."

"Now, Dr. Farrell, the matter transmitter does actually transmit over a power-transmission tube?"

"Yes. Of the type developed by us for communications."

"But it is a power tube?"

"Yes."

"Then are you certain that you are sending no energy?"

"I object!" shouted Tinkin. "The question has no answer!"

"Hasn't it?" queried Kingman. "My worthy opponent, all questions have an answer."

"Objection overruled," snapped Hamilton sourly. "Let the witness answer."

"It is impossible to send communications without sending some energy. It is the intent to which the energy is put that determines the classification."

"Explain further."

"You must send energy when you communicate with a light-blinker," grinned Farrell. "The receiving party receives the energy, but couldn't possibly read a newspaper with it. The beams at Venus Equilateral send out several million watts —and by the time they get to Luna, they require amplifications bordering on the million-times before they are usable. The intent is clear—we are not supplying power, we are sending intelligence."

"I contend," said Kingman to the judge, "that the contract states clearly that developments of this device are to be used for communications only when operated by Venus Equilateral. I further contend that the transmission of matter does not constitute a communication, but rather a transfer of energy."

"I object," said Tinkin. "If this

statement was objectionable to the learned counsel before, it is equally objectionable to me now."

"Previously," said Kingman suavely, "counsel was trying to influence a witness. I am merely trying to explain my point."

Hamilton cleared his throat. "Counsel is merely attempting to influence the Court; the same privilege will be available to his opponent at the proper time. That is why we have courts."

Tinkin sat down.

"I maintain that the concept of communication precludes matter transmission," stormed Kingman. "Matter transmission becomes a problem for the transportation companies and the power companies. Matter, your honor, is energy. They are transmitting energy!"

He stalked over to Tinkin and smiled affably. "Cross-examination?" he offered.

"No questions," said Tinkin.

Hamilton rapped on the bench. "Court is adjourned for ten minutes!"

"Looking for something?" asked Don. Arden turned from the window and faced him.

"I was trying to see Niagara Falls," she smiled. "I've heard that you could see 'em from Buffalo."

"You can," laughed her husband, "but not from this part of Buffalo. What do you want to see Niagara Falls for, anyway? Just a lot of water falling over a cliff at two pints to the quart."

"If you recall, chum, we went to Mars, not Niagara. There wasn't two pints of water on the whole planet, let alone a thing like Niagara."

Don nodded. "At the risk of offending a lot of Buffalonians, I'm beginning to dislike the place."

"It isn't the people," said Arden. "It's the position we're in. Bad, huh?"

"Not going too good at all. Kingman slips in a sly dig every now and then. Frankly, I am getting worried. He's got a few points that really hit very close to home. If he can sell the judge on a couple more of them, we'll be under the sod."

"You won't be out entirely, will you?"

"Not entirely. He'll have to use the beams of Venus Equilateral to operate, but he'll be collecting all the real gravy. We'll just be leasing our beams to him."

"Well, don't go down without a fight, chum."

"I won't. I really hate to see Kingman get ahead of this, though." Don stretched, took another look out across the city of Buffalo, and then said: "We'd best be getting back. We'll be late . . . he said ten minutes."

They went down the staircase slowly, and at the courtroom door they met Keg Johnson. The latter smiled wearily. "Not too good?"

"Nope."

"Don, if you lose, then what?"

"Appeal, I guess."

"That isn't too good. Judges do not reverse lower courts unless a real miscarriage of justice takes place."

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"I know, but that's our only chance."

"What would you advise me to do?"

"Meaning?" asked Don.

"Interplanet. We'll be run right out of business if this thing goes over to Kingman and that bunch."

"I know."

"Look, Don, have you tried living matter?"

"Plants go through with no ill effects. Microscopic life does, too. Animals we have tried usually die because of internal disorders—but they move while being scanned, and their bodies come out looking rather ugly. An anaesthetized mouse went through all right—lived for several hours. Died because the breathing-function made a microscopic rift in the lungs, and the beating heart didn't quite meet true. We must speed up the scanning-time to a matter of micro-seconds and then we can send living bodies with no harm."

"That would clean out the space lines," said Keg. "I think I'll offer that bird a slice of Interplanet for an interest, if he wins. We've got to have it, Don."

"I know, Keg. No hard feelings."

"Of course," said Keg wistfully. "We'll be across a barrel if you win, too. But the barrel will be less painful with you holding the handles than if Terran Electric holds them. The same offer goes for you, too."

"O.K.," nodded Channing. He turned and entered the courtroom.

Tinkin called Don Channing to the stand as his first witness. Don explained the function of Venus Equilateral, the job of interplanetary communications, and their work along other lines of endeavor. Then Tinkin said to the judge:

"I have here a glass cube, three inches on a side. This cube was transmitted from Venus Equilateral to the Lunar Station. I offer it as Exhibit A. It was a test-sample, and as you see, it emerged from the test absolutely perfect."

The judge took the cube, examined it with some interest, and then set it down on the desk.

"Now," said Tinkin, "if you do not object, I should like to present a demonstration of the matter transmitter. May I?"

Hamilton brightened slightly. "Permission is granted."

"Thank you." Tinkin made motions and the technicians came in with the two cabinets.

"This isn't good," said Kingman's assistant to the lawyer. "The old goat looks interested."

"Don't worry," said Kingman. "This'll take a long time, and by the time they get done, Hamilton will be ready to throw them out. Besides, it will make a good arguing point for my final blast. And, brother, I've got a talking-point that will scream for itself."

"But suppose they convince—"

"Look," smiled Kingman, "this is really no argument as to whether matter or intelligence is carried. Believe me, that has nothing to do with it. I'm keeping this one under the wraps until shooting-time so they won't be able to get an argument against it. We're a cinch. That's why I kept it in a legal court instead of a technical court. The Techs would award it to Channing on a technical basis, but the legal boys have got to follow my argument."

"How about an appeal?"

"The record of this court is still a very heavy argument. Look, they're about to start."

The racket and hubbub died, and Tinkin faced the judge. "These are plainly labeled. They are matter transmitter and matter receiver. We have here a set of metal bars. They are made of copper, steel, aluminum, some complex alloys, and the brother to that glass cube you have before you. We will transmit this set of objects from here to there. Have you any suggestions?"

"A matter of control and identity. What have you for control?"

"Nothing that is outside of our hands," smiled Tinkin. "Would you care to send something of your own? Your gavel? Inkwell? Marked coin? Anything?"

"I'd offer my glasses except for the fact that I can not see without them," said Judge Hamilton.

"We wouldn't break them or damage them a bit."

"I know—that much faith I have—but I'd not see the experiment."

"A good point. Anything else?"

"My watch. It is unique enough for me." He handed over the watch, which was quite sizable.

Tinkin inspected the watch and smiled. "Very old, isn't it? A real collector's item, I daresay."

Hamilton beamed. "There are nine of them in the Solar System," he said. "And I know where the other eight are."

"O.K., we'll put it on the top. I'll have to stop it, because the movement of the balance wheel would cause a rift during transmission."

"How about the spring tension?"

"No need to worry about that. We've sent loaded springs before. Now, people, stand back and we'll go on the air."

Don Channing himself inspected the machinery to see that nothing was wrong. He nodded at Walt Franks at the receiver, and then started the initial operations. "We are synchronizing the two machines," he said. "Absolute synchronization is necessary. Ready, Walt?"

"Right!"

Channing pushed a button. There was a minute, whirring hum, a crackle of ozone, very faint, and the almost-imperceptible wave of heat from both machines. "Now," said Walt Franks, "we'll see."

He opened the cabinet and reached in with a flourish.

His face fell. It turned rosy. He opened his mouth to speak, but nothing but choking sounds came forth. He spluttered, took a deep breath, and then shook his head in slow negation. Slowly, like a boy coming in for a whipping, Walt took out the judge's watch. He handed it to Don.

Don, knowing from Walt's expression that something was very, very wrong, took the watch gingerly, but quickly. He hated to look and was burning with worried curiosity at the same time.

In all three dimensions, the watch had lost its shape. It was no longer a lenticular object, but had a very faint sine wave in its structure. The round case was distorted in this wave, and the face went through the same long swell and ebb as the case. The hands maintained their distance from this wavy face by conforming to the sine-wave contour of the watch. And Channing knew without opening the watch that the insides were all created on the sine-wave principle, too. The case wouldn't have opened, Don knew, because it was a screw-on case, and the threads were rippling up and down along with the case and cover. The knurled stem wouldn't have turned, and as Channing shook the watch gently, it gave forth with one—and only one—tick as the slack in the distorted balance wheel went out.

He faced the judge. "We seem—"

"You blasted fools and idiots!" roared the judge. "Nine of them—!"

He turned and stiffly went to his seat. Channing returned to the witness chair.

"How do you explain that?" roared Judge Hamilton.

"I can only think of one answer," offered Channing in a low voice. "We made the power supplies out of power and voltage tranducers and filtered the output for sixty cycles. Buffalo is still using twenty-five-cycle current. Since the reactances of both capacity and inductance vary according to the—"

"Enough of this!" roared Hamilton. "I— No, I may not say it. I am on the bench and what I am thinking would bring impeachment. Proceed Attorney Kingman."

Kingman took the cue, and before anyone realized that it was still Tinkin's floor, he opened.

"Dr. Channing, you can send a gallon of gasoline through this, ah, so-called matter transmitter?"

"Naturally."

"Then, your honor, it is my contention that no matter what the means or the intent, this instrument utilizes the sub-etheric effects to transmit energy! It is seldom possible to transmit power over the same carriers that carry communications—only very specialized cases prevail, and they are converted to the job. But this thing is universal. Perhaps it does transmit intelligence. It will and can be used to transmit energy! Matter, your honor, is energy! That, even the learned opponent will admit. We have our own means of transmitting power—this is another—and no matter what is intended, power and energy will be transmitted over its instruments.

"Since this machine transmits energy, I ask that you rule that it fall under that classification. I rest my case."

Hamilton nodded grumly. Then he fixed Tinkin with an ice-cold stare. "Have you anything to offer that may possibly be of any interest to me?"

Tinkin shook his head. He was still stunned.

"I shall deliver my ruling in the morning. I am overwrought and must rest. Adjourned until tomorrow morning."

The only sounds in the room were the tinkle of glassware and the occasional moan of utter self-dislike. Channing sat with his glass in his hand and made faces as he lifted it. Franks matched his mood. Both of them were of the type that drinks only when feeling good because it made them feel better. When they drank while feeling low, it made them feel lower, and at the present time they were about as far down as they could get. They knew it; they took the liquor more as a local anaesthetic than anything else. Arden, whose disappointment was not quite as personal as theirs, was not following them drink for drink, but she knew how they felt and was busying herself with glass, ice, and bottle as they needed it.

It was hours since the final letdown in the court. They knew that they could appeal the case, and probably after a hard fight they would win. It might be a year or so before they did, and in the meantime they would lose the initial control over the matter transmitter. They both felt that having the initial introduction in their hands would mean less headache than having Terran Electric exploit the thing to the bitter end as quickly as possible.

The fact of sunrise—something they never saw on Venus Equilateral—did not interest them one bit. It grew light outside, and as the first glimmerings of sunrise came, a knock on their door came also.

"Mice," hissed Walt.

"S'nock on door."

"Mice knocking on door?"

"Naw."

"Mice gnawing on door?"

"It's Wes Farrell," announced Arden, opening the door.

"Let'm in. S'all right, Wes. Anyone c'n make mishtake."

"He's sober."

"Gettum drink," said Don. "Gettum drink—gettum drunk."

"Look, fellows, I'm sorry about

that fool mistake. I've been working on the judge's ticker. I've fixed it."

"Fitched it?" asked Walt, opening his eyes wide.

"Close 'em— Y'll bleed t' death," gurgled Don.

Farrell dangled the judge's watch before them. It was perfect. It ticked, it ran, and though they couldn't possibly have seen the hands from a distance of more than nine inches, it was keeping perfect time.

Don shook his head, moaned at the results of the shaking, put both hands on his head to hold it down, and looked again. "How'ja do it?"

"Made a recording of the transmitted signal. Fixed the power-supply filters first. Then took the recording—"

"On whut?" spluttered Walt.

"On a disk like the alloy-tuners in the communications beams. Worked fine. Anyway, I recorded the signal, and then started to buck out the ripple by adding some out-of-phase hum to cancel the ripple."

"Shounds reas'n'ble."

"Worked. I had a couple of messes, though."

"Messessesesss?" hissed Walt, losing control over his tongue.

"Yes. Had a bit of trouble making the ripple match." Farrell pulled several watches from his pocket. "This one added ripple. It's quite cockeyed. This one had cross-ripple and it's really a mess. It sort of looks like you feel, Walt. I've got 'em with double ripples, triple ripples, phase distortion, overcorrection, and one that reminds me of a pancake run through a frilling machine."

Channing looked at the collection of scrambled watches and shuddered. "Take'm away—*brrrrrr.*"

Arden covered the uninspiring things with a tablecloth.

"Thanks," said Don.

"Do you think the judge'll forgive us?" asked Farrell.

"Don't say it," said Walt, bursting with laughter.

"I don't have to," chortled Don.

"They're both hysterical," explained Arden.

"Carbogen and Turkish bath," said Don. "And quick! Arden, call us a taxi."

"You're both taxis," giggled Arden. "O.K., fellows. Can do." She went to the phone and started to call.

Farrell looked uncomprehendingly at Walt and then at Don, and shook his head. "Mind telling me?" he pleaded.

"Wes, you're a million!" roared Channing, rolling on the floor.

Farrell turned to Arden.

"Let them alone," she said. "Something probably pleases them highly. We'll find out later—Yes? Operator? Will you call a cab for Room 719? Thanks."

Attorney Tinkin faced Judge Hamilton with a slight smile. "Prior to your ruling, I wish to present you with your watch. Also I ask permission to sum up my case—an act which I was unprepared to do last evening."

Hamilton reached for the watch, but Tinkin kept it.

"You may state your case—but

it will make little difference in my ruling unless you can offer better evidence than your opponent."

"Thank you," said Tinkin. He made a show of winding the watch, and he set it accurately to the court clock on the wall. "Your honor, a telegram is a message. It requires energy for transmission. A letter also requires energy for carrying and delivery. A spacegram requires the expenditure of great energy to get the message across. The case in hand is this: If the energy is expended in maintaining the contact, then communications are involved. But when the energy is expected to be used on the other side—and the energies transmitted are far above and beyond those necessary for mere maintenance of contact, it then may be construed that not the contact but the transmittal of energy is desired, and power transmission is in force."

Tinkin swung Hamilton's watch by the chain.

"The matter of sending flowers by telegram is not a matter of taking a bouquet to the office and having the items sent by electricity to Northern Landing. A message is sent—an order to ship or deliver. It makes no difference whether the order be given in person or sent by spacegram. It is a communication that counts. In this device, a communication is sent which directs the device to produce a replica of the transmitted object. Ergo it must fall under the realm of communications. I will now demonstrate this effect, and also one other effect which is similar to telegraphic communications."

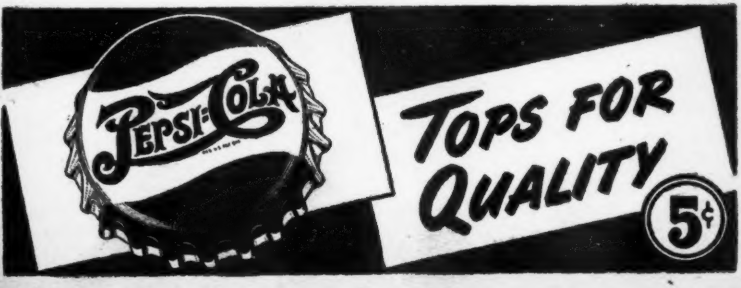
Tinkin ignored Hamilton's outstretched hand, and put the watch in the cabinet. Hamilton roared, but Tinkin held up a hand to stop him. "I assure you that this will cause no ill effects. We have repaired the damage."

For every minute of delay between now and the moment I receive my watch, I shall fine you one hundred dollars for contempt of court."

"Well worth it," smiled Tinkin.

Channing pressed the switch.

Click! went the receiver, and from a slide, Channing removed the judge's watch. With a flourish, he started it, and handed it to the judge, who glared.



"Now," added Tinkin, "I wish to add—

Click!

"—two objects may be similar in form—

Click!

"—but can not be identities!

Click!

"However, two communications—

Click!

"—may be dissimilar in form—

Click!

"—but identical in meaning!

Click!

"We have before us—

Click!

"—a condition where—

Click!

"—identical messages are—

Click!

"—being reproduced in identical form—

Click!

"—just like a bunch of—

Click!

"—carbon copies!"

Click!

"The production rate of which—

Click!

"—will be high enough—

Click!

"—to lower the cost—

Click!

"—of this previously rare item—

Click!

"—until it is well within the reach of all."

Click!

"Just as in communications—

Click!

"—we may send an order—

Click!

"—directing the fabrication—

Click!

"—of several hundred similar items!

Click!

"And our supplier will bill us—

Click!

"—for them later!"

Brrr-rup!

"That last buzz or burp was a signal that we have reached the end of our matter bank. Our credit, for example, has run out. However, Dr. Channing is about to make a substantial deposit with the manufacturer, and we will resume operations later. I ask you—

Click!

"—can you do this with energy?"

Click!

"Stop that infernal—

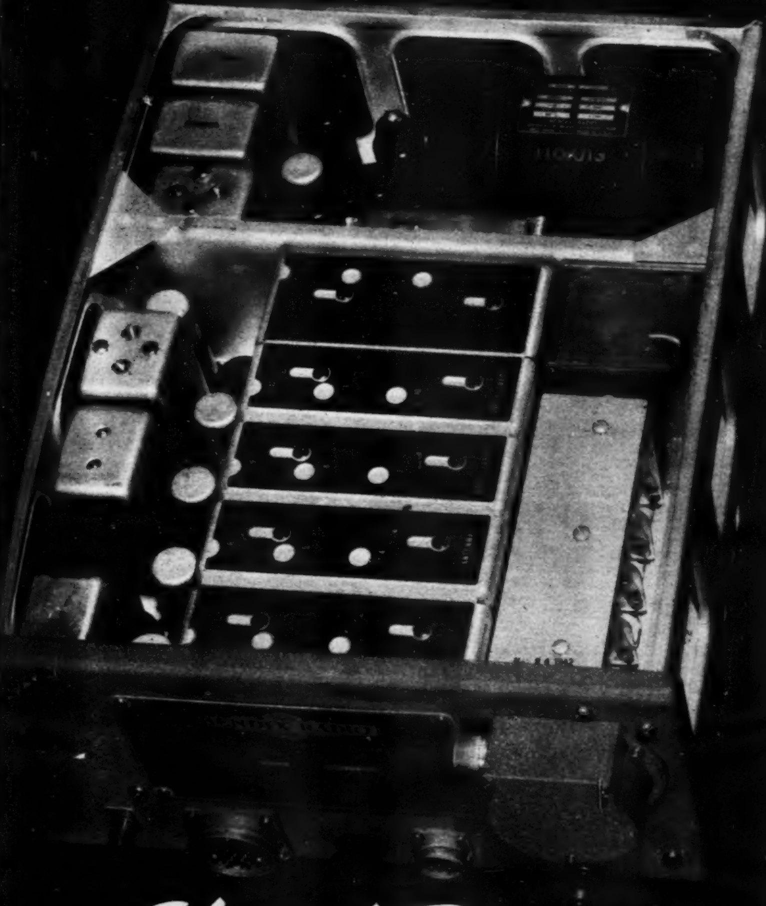
Click!

"—machine before I have you all held for disrespect, perjury, contempt of court, and grand larceny!" yelled the judge.

Channing stopped the machine and started to hand out the carbon-copy watches to the audience, who received them with much glee. Kingman came to life at this point. He rose from his chair and started to object, but he was stopped by Tinkin who leaned over and whispered:

"My worthy and no doubt learned opponent, I'd advise that you keep your magnificent oratory buttoned tight in those flapping front teeth of yours. If we all get into that gadget—how would you like to fight ten or twelve of us?"

THE END.



Electrical Pigeon

RADIO COMPASS
VAR
E
W
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
260
270
280
290
300
310
320
330
340
350

Pigeon Sense

by RAYMOND F. JONES

Bendix Radio Division of Bendix
Aviation Corporation

Photographs Courtesy Bendix

***Jones** tells something of one of the most useful of the radio navigational aids -- the radio compass. A radio direction finding loop is a simple gadget, but the darned thing doesn't know "toward" from "away"; eliminating that fault, making it self-acting — those called for extremely ingenious applications of electric laws.*

Aviation historians thrive on the thesis that aircraft design began to get somewhere only when the early inventors and designers quit copying from the birds and struck out for themselves along the path of aerodynamics where it was clearly evident that the birds could stand considerable improvement.

Maybe so. Nevertheless the modern bomber on its way home from a mission gives a pretty good imitation of a homing pigeon—admittedly with improvements.

The homing instinct of the bomber is contained within the hookup of its automatic radio compass. Externally, this consists of a loop antenna mounted on the back or belly of the ship, a tuning control by which signals from home base may be tuned in, and a compass dial with a needle that indicates the direction of the base radio station with respect to the heading of the plane.

The old-timers among us will probably argue that Doc Smith and Dick Seaton were the inventors of the first truly automatic compass. That was fifteen years ago in the first "Skylark" when Seaton focused one of his X-treated copper needles on DuQuesne and followed him over seventy-five light-years of space with no more attention to the compass than storing it in a corner of his bureau drawer.

The modern automatic compass is not quite so compact, nor does it have the range of Doc Smith's. Also, it requires a source of r.f. radiation to focus upon. Otherwise, it gives a very creditable realization of Doc's fancy.

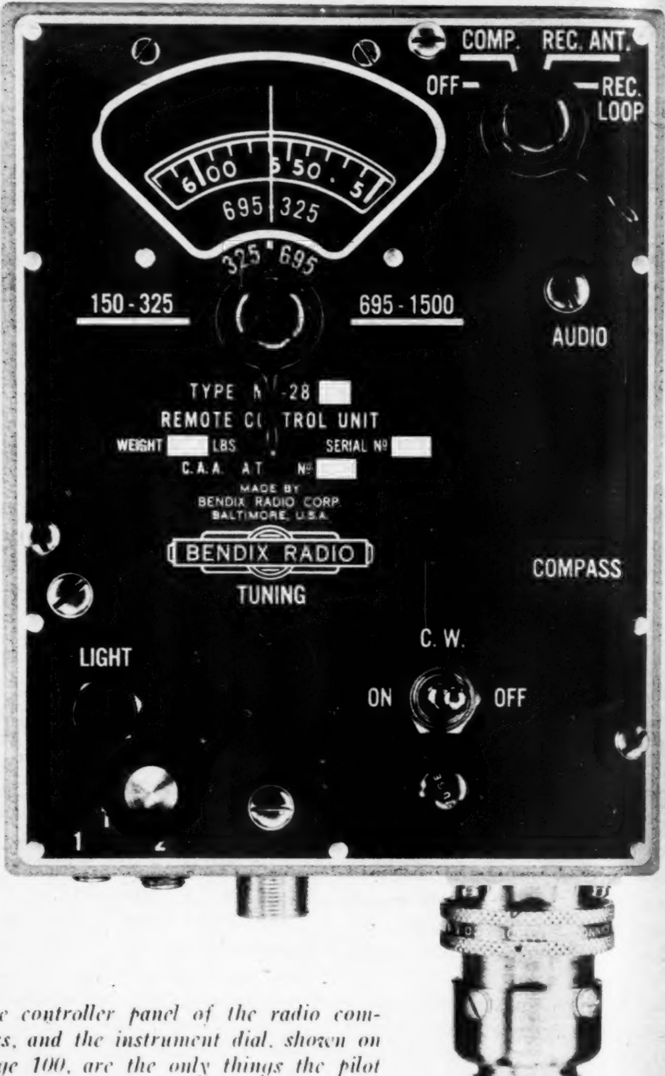
So much so that nearly every warplane flying today carries one of them.

Aboard a bomber, the automatic radio compass functions in the best of traditions with a minimum of controls and completely automatic functioning. A switch turns the compass on. A crank rotates the tuning condensers, and a compass indicator shows the direction from which the radio waves are arriving.

But behind these externals is an amazing trail of converging lines of research which began with the discovery of the Edison effect and the equations of Maxwell. The automatic compass combines in a single instrument the multiple crafts and techniques of the radio art in a manner that demonstrates the almost incredibly complex end result which simple beginnings may produce.

The most fundamental principle of the compass is the directive characteristic of a coil used as an antenna—the familiar loop antenna. The loop principle has been known for a long time, but the development of associated equipment to make its application practicable has been slow in coming.

The directional characteristic demonstrates itself as follows: A wave front approaching a loop antenna from a direction perpendicular to the plane of the loop will tend to induce equal and oppositely directed voltages in the two halves, or limbs, of the loop. These voltages cancel each other and the


COMP.
REC. ANT.
OFF
REC. LOOP
6 00 5 50 . 5
695 325
325 695
150 - 325
695 - 1500
AUDIO
TYPE
-28
REMOTE
TROL UNIT
WEIGHT
LBS
SERIAL Nº
C. A. A.
Nº
MADE BY
BENDIX RADIO CORP.
BALTIMORE, U.S.A.
BENDIX RADIO
TUNING
COMPASS
LIGHT
C. W.
ON
OFF
1
2

The controller panel of the radio compass, and the instrument dial, shown on Page 100, are the only things the pilot has to bother with; the rest is automatic.

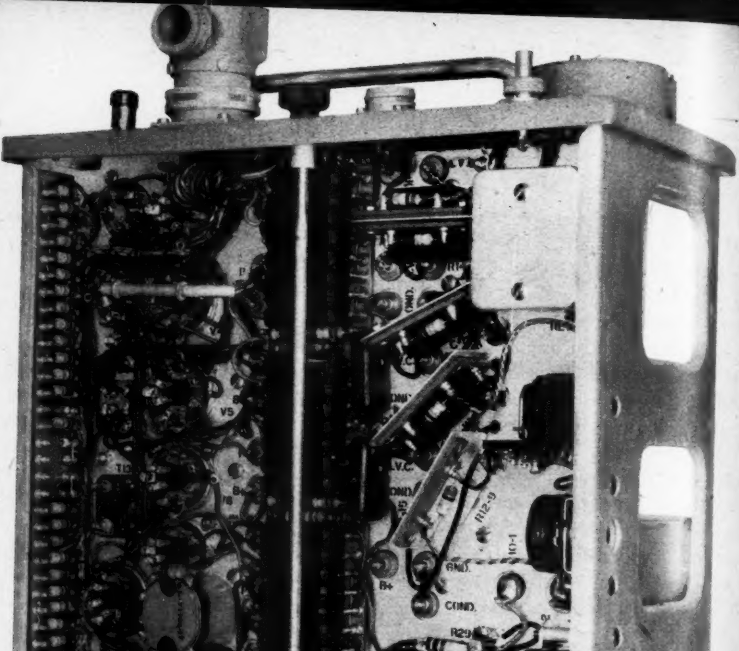
result will be no current flowing around the loop.

In Figure 1 a wave front striking the loop at an angle such as from direction B or D will induce a voltage in the nearest limb of the loop a fraction of a microsecond before it does in the far side of the loop. As a result, the voltages induced in each side, while equal in value, are slightly out of step—out of phase. They do not cancel each other completely because they do not reach points of equal value at the same time. Their resultant effect can be determined by the parallelogram of force in Figure 1, e and e_1 being the opposing voltages and E_r, the resultant; a represents the phase angle or fraction of a complete 360° cycle separating the two waves.

Here is a basic fact in the operation of the automatic radio compass: The voltage induced by a wave front from source B will be in a direction around the loop opposite to the direction of a voltage induced by a wave from source D. That is, they will be out of phase—180° out.

The maximum induced signal will be present when the wave front approaches from a direction parallel to the plane of the loop as at A or E. The position of the loop with respect to the wave front that induces minimum or zero signal as C or C′ is called the null point. As the loop is turned on its axis about this null position so that waves from C or C′ approach first from one side of the perpendicular to the plane of the loop and then from

The loop shield permits free rotation of the loop, while minimizing air resistance. And it's one part of an "all-metal" plane that isn't and can't be metal.



Unlike home radio receivers, this radio compass equipment has to be engineered to stand terrific acceleration loads. Design must be worked out from both mechanical and electrical considerations, extremely rigid mounting of condensers—on phenolic mounting strip down center—and resistors—at far side—is essential. Wiring is performed, laced together, and installed as a unit. Vibration as well as acceleration must be fought.

the other side, the current flowing in the loop will change direction abruptly as the null point is passed.

The earliest direction finding was achieved by means of a receiver and a loop antenna, which was mounted on an axis about which it could be revolved. The loop was turned manually by an operator until he determined the point of minimum or zero signal in phones attached to the receiver. At this point he knew that the transmitter was on a line directly in front of him—or directly behind him!

This sometimes tragic uncertainty was euphoniously termed 180° ambiguity.

The difficulty was overcome by the addition of a small vertical antenna nearby, whose output was connected to the loop by means of a switch. The loop was rotated from the null and the nondirectional antenna connected to one side of the loop. An increase or decrease in signal strength indicated from which of the two possible directions the radio wave was approaching.

This system served well enough for many years aboard ship and at land stations. Other modifications, chiefly dependent upon trick antenna systems, were introduced. Aircraft required something better, however, for it was difficult for the pilot or navigator to give sufficient attention to the loop to hold it on the null point while the ship was attempting to home on the incoming beam—fly towards the transmitter. Determination of position by taking cross-bearings on two or more stations became a difficult feat at a speed of three to four hundred miles per hour.

This called for an automatic arrangement by which the loop could be motor driven in such a manner that the loop would constantly turn to the null position when a signal was being received, and with no attention from the pilot regardless of the maneuvering of the plane.

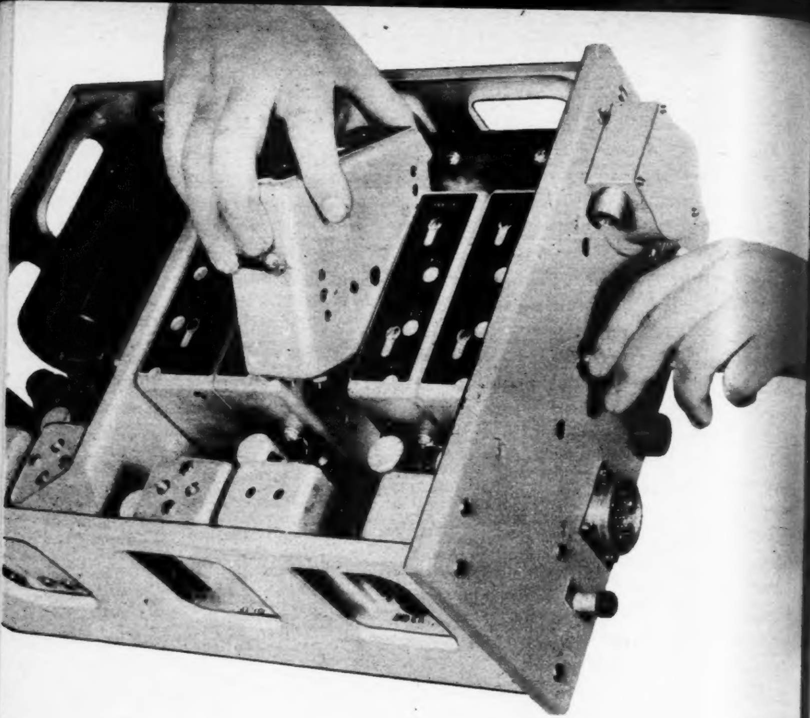
The means by which this automatic control is now obtained involves a tremendous complexity of circuits and represents some of the most ingenious radio engineering accomplished to date.

Broken down into its three fundamental features, the mechanism of the automatic radio compass becomes less formidable and fairly simple to understand—in principle, at least.

The first of these is the fact that the loop contains minute signal currents which reverse in direction as the loop rotates through the null position. A reversible a. c. motor could be used to turn the loop to desired positions, but, obviously, the infinitesimal signal currents in the loop cannot be used to power the motor.

The second fundamental division of the problem then involves the design of a means by which the loop currents can be utilized to control the motor which will rotate the loop.

Thirdly, there is the necessity of indicating on the instrument panel inside the plane the exact position of the loop buried inaccessibly in its housing somewhere on the belly or



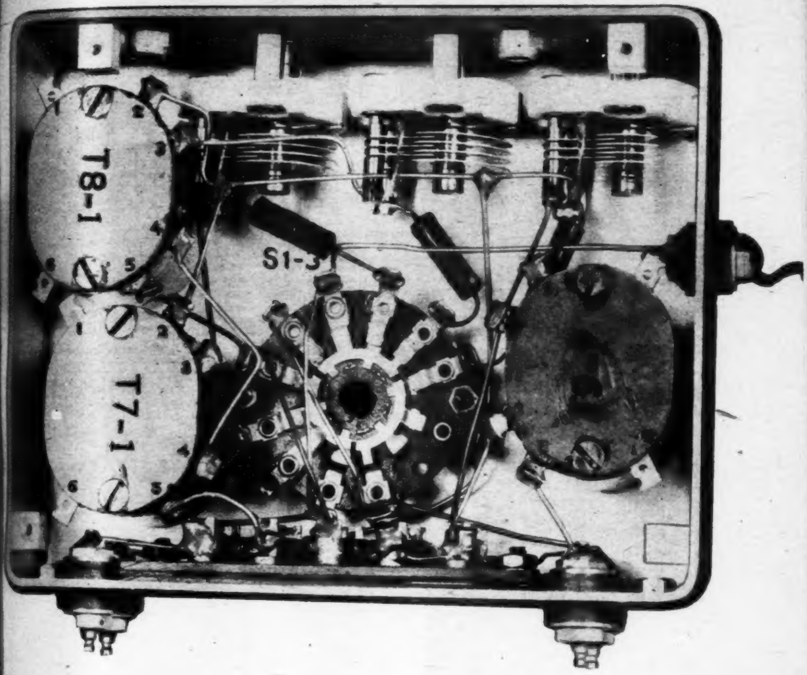
Another engineering refinement that the servicing crew loves as much as the operation officer. The different stages of the equipment are built up as units in separate cans. The five cans along the center each contain RF coils, trimmer condensers and band switch. The switches are driven by a long shaft inserted through the front panel and extending to a motor drive at the rear of the chassis. That makes for continuous service.

on the back of the ship.

A consideration of the first item gives us the broad objective involved in the design of the compass: To utilize the reversible currents in the loop as a means of control so that the motor attached to the loop will rotate it to a null position.

With this in mind we can go at once to the next requirement, the actual design of such a controlling means. Figure 2 indicates the basic diagram of the compass circuit.

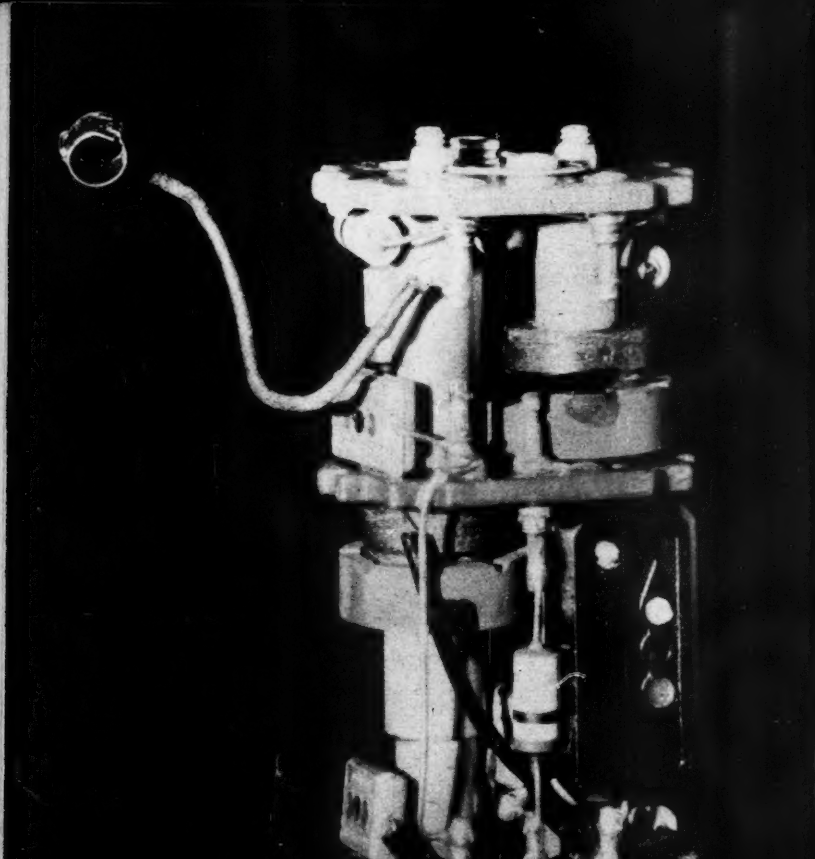
A combination of loop antenna and a vertical, nondirectional antenna is used to provide signal input to the compass. The voltages induced in these two antennas are a quarter cycle or 90° out of phase with each



Compactness and rigidity are both essential inside one of the cans. The RF coils inside the bakelite cases are each surrounded by a powdered iron shell and the inductance is variable by a moving powdered iron core. All connections are made with rigid busbar so that circuit capacitances won't change due to vibration and high-g pull-outs of dive-bombers.

other. For the moment we will disregard the vertical antenna input and follow the loop voltage because it goes through considerably more circuit than does the other.

The loop signal is coupled directly to a single r.f. amplifier stage where its level is raised. In the plate circuit of this amplifier tube, however, there is a parallel combination of a coil and condenser forming a tuned circuit. But the circuit is tuned to a frequency below the lowest receiving range of the compass and therefore offers capacitive reactance to all incoming frequencies and—if the reason seems complicated, remember at least the fact—it shifts the loop voltage another 90° so that it may either be



The IF coil assembly of the radio compass receiver has to be built to stand dive-bombing—and to function perfectly as an electrical unit too. It must withstand moisture, heat, freezing, acceleration, extremely low air pressure—and they'd like them to stop .50 caliber machine gun slugs, too!

in phase with the vertical antenna voltage or 180° out of phase with it.

After phasing, as this operation is termed, the loop voltage is coupled to the grids of a pair of tubes called balanced modulators. These two tubes are triodes and are contained in the same envelope. A 6N7 is used.

The two grids of the 6N7 are in phase with each other with respect to the loop signal. That is, at any instant the voltage on them is the same value and is increasing or decreasing at the same rate.

Also coupled to the grids of the 6N7 modulator is the output of another 6N7 tube which is a local oscillator generating a frequency of forty-eight cycles per second. Keep your eye on this forty-eight cycle frequency. It's elusive, but in the end it's the only thing we're going to be concerned about.

The forty-eight cycle frequency is coupled to the modulator grids so that they are out of phase with each other with respect to this forty-eight cycle component. As one grid reaches the maximum positive forty-eight cycle swing, the other grid is at the maximum negative swing, and vice versa.

The two modulator plates are connected push-pull fashion to one primary of a coupling transformer. The modulator tube functions as a pair of electrical switches. During one half of each of the cycles of voltage supplied by the local forty-eight cycle oscillator tube, Grid 1 of the modulator tube is positive and that section of the tube passes an impulse of incoming radio signal from the loop circuit to the primary of the coupling transformer. This pulse of loop signal voltage will bear the outline shape of a half cycle of oscillator voltage as at C, Figure 3. During the time that Section 1 of the modulator tube is passing current, Section 2 is nonconducting because its grid is made negative by the oscillator.

During the second half of each cycle supplied by the local oscillator this condition is reversed. Section 1 of the modulator is nonconducting, while Section 2 does all the work. But here's the important point in the functioning of this modulator circuit: The current through the coupling transformer primary travels in one direction when Section 1 of the modulator is conducting. The current travels in the opposite direction in the coil when Section 2 is conducting. Examine C and D of Figure 3 closely. Note that they are 180° out of phase as a result of passing through the coil in opposite directions.

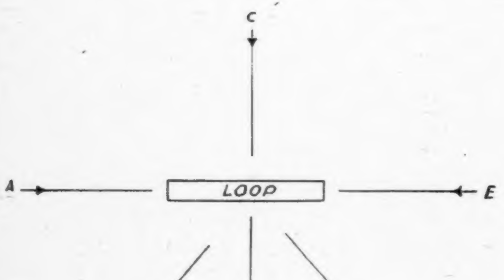
The signal picked up by the vertical antenna now enters the picture. The voltage induced in the vertical antenna is passed through another primary coil of the coupling transformer and is combined with the loop input which has now gone through severe modifications by means of the phaser circuit and the balanced modulator.

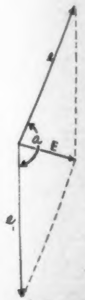
Since the loop voltage and the vertical antenna voltage were originally out of phase by 90° and the loop voltage has been shifted by another 90° in passing through the phaser, the two signals as they appear in the primary of the coupling transformer will either add their effects to each other or subtract them in a direct arithmetical relationship as they influence the secondary coil of the transformer. Assume that the vertical antenna input is constantly present and that the loop signal after phasing is in phase with it. That means that if each signal has a peak value of ten volts the resultant of the two will be twenty volts.

Suppose then that the grid of Section 1 of the modulator becomes positive due to the action of the local oscillator and a pulse of signal from the loop flows through the coupling transformer primary and combines in the secondary with the signal from the vertical antenna. The result will be an addition that will increase the strength of the signal in the secondary and give it the outline shape of a half cycle of the local oscillator frequency, as at F of Figure 3.

During the remainder of the oscillator cycle, the conditions within the modulator are reversed. Section 1 becomes nonconducting and Section 2 passes a pulse of loop signal through the primary of the coupling transformer—in the direction opposite to that in which the previous pulse traveled. Instead of adding, the loop signal now subtracts from the vertical antenna signal and there is a resultant de-

Fig. 1. The theory of the loop antenna, discussed in the text.





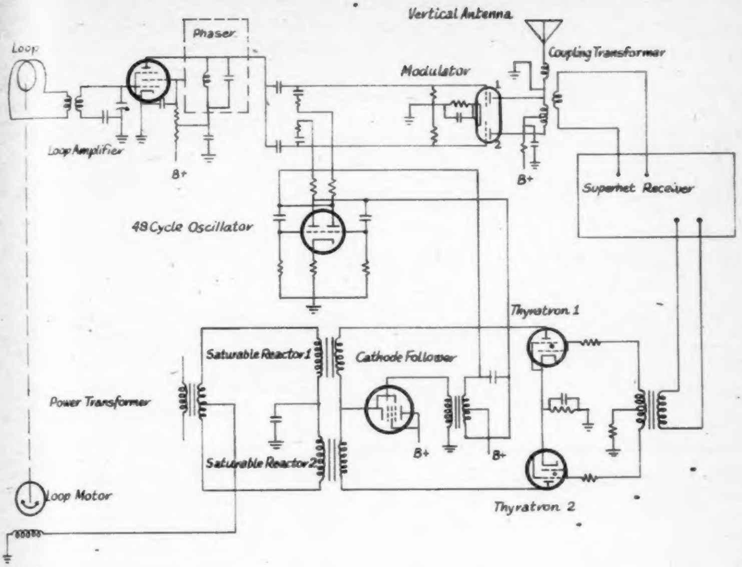

Vertical Antenna
Phaser
Loop
Coupling Transformer
Modulator
1
2
Loop Amplifier
B+
B+
Superhet Receiver
48 Cycle Oscillator
Thyratron 1
Saturable Reactor 1
Cathode Follower
Power Transformer
B+
B+
Saturable Reactor 2
Loop Motor
Thyratron 2

Fig. 2. Circuit diagram of the system that allows the radio compass to distinguish "toward" and "away from." See text.

crease in the secondary of the coupling transformer current such that the outline or envelope shape of the wave corresponds to the negative half of one of the cycles produced by the local oscillator.

The result then is a carrier signal from some radio station that now bears an added modulation of forty-eight cycles per second. It makes no difference if the carrier already bears modulation of speech or music or is a continuous wave telegraph or radio range station. In the end, the forty-eight cycles is filtered off and any other modulation may be listened to by means of phones, or ignored. It has no influence on the compass operation.

The resultant of the combined loop and vertical antenna inputs, bearing the forty-eight cycle modulation, is passed through an ordinary superhet circuit and amplified and detected and the forty-eight cycle frequency is filtered out from the rest of whatever modulation may be present.

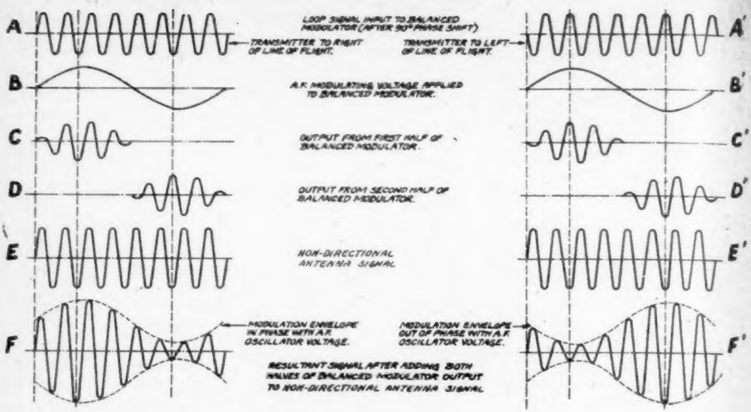

A
LOOP SIGNAL INPUT TO BALANCED MODULATOR (AFTER 90° PHASE SHIFT)
TRANSMITTER TO RIGHT OF LINE OF FLIGHT.
TRANSMITTER TO LEFT OF LINE OF FLIGHT.
A'
B
A.F. MODULATING VOLTAGE APPLIED TO BALANCED MODULATOR.
B'
C
OUTPUT FROM FIRST HALF OF BALANCED MODULATOR.
C'
D
OUTPUT FROM SECOND HALF OF BALANCED MODULATOR.
D'
E
NON-DIRECTIONAL ANTENNA SIGNAL
E'
F
MODULATION ENVELOPE IN PHASE WITH A.F. OSCILLATOR VOLTAGE.
MODULATION ENVELOPE OUT OF PHASE WITH A.F. OSCILLATOR VOLTAGE.
RESULTANT SIGNAL AFTER ADDING BOTH HALVES OF BALANCED MODULATOR OUTPUT TO NON-DIRECTIONAL ANTENNA SIGNAL
F'

Fig. 3. How to make a radio set know which way is which; the direction's easy, but telling which way to follow that line took some figuring out.

The receiver is not exactly an ordinary superhet, either. If you'll take a look at the photographs and compare the neatly laced cable wiring and the solid anchorage of the resistors and fixed condensers with the haywire mess in the bottom of your own home receiver you'll get the idea. The receiver of the compass is built to take the high-g acceleration of dive bombers and no parts or wiring are left floating around to breed parasites or disengage themselves completely at just the wrong moment. In addition, since the phase relationship of the signals is the characteristic we are concerned about, the troublesome item of phase distortion is reduced to as near zero as is practicable.

Up to now this may seem like a waste of effort because we started out with a forty-eight cycle oscillation, went through a complicated process to modulate a radio wave with it, and now we throw away the radio wave and have only the forty-eight cycles with which we started.

But that's only half the story.

Remember we began with the loop signal coming to the modulator in phase with the signal from the vertical antenna. Note that under these circumstances the forty-eight cycle modulation envelope on the incoming carrier is in phase with the original forty-eight cycle frequency generated by the local oscillator. Compare B and F of Figure 3.

Now look at the reverse condition in which the loop signal, A′ is 180° out of phase with the signal E′ in the vertical antenna. As the grid of Section 1 of the modulator swings positive, a pulse of current passes through the tube and through the primary of the coupling transformer in the same direction as before except that its time relation is such that when the vertical antenna signal is at a positive peak the loop signal combining with it is at a negative peak and the result is a subtraction of energy and a decrease in the strength of the signal appearing in the secondary of the coupling transformer. When Section 2 of the modulator becomes conducting, the direction of the loop current in the primary is reversed; it is effectively rotated in phase through 180° and is in the proper relationship with the vertical antenna signal so that the two add.

Now examine B′ and F′ of Figure 3 to see what has happened. At F′ the modulation envelope, instead of being in phase with the forty-eight cycle frequency generated by the local oscillator, is out of phase with it by 180°.

Refer to Figure 3 and follow it once more from the beginning now: If the signal from the radio station is approaching the loop from a direction which is to the right of its

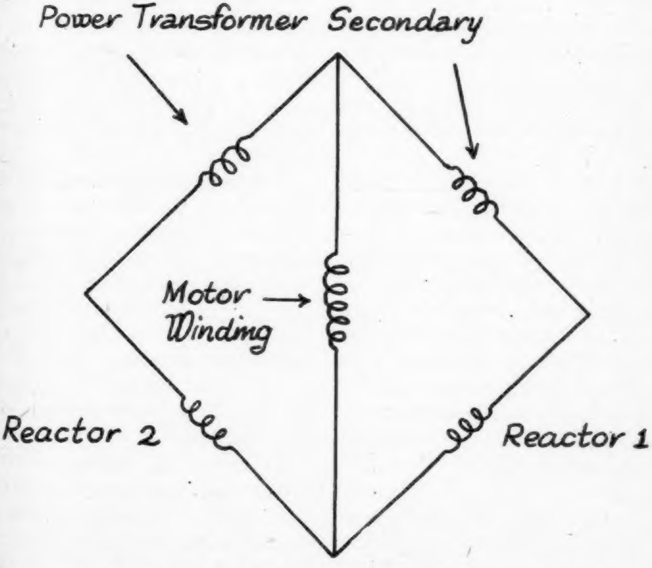


Fig. 4. The loop motor control discriminator circuit.

null point, the loop voltage at the modulator grids will be in phase with the vertical antenna signal. When these are combined and the forty-eight cycle modulation placed upon the resulting wave, the modulation envelope will be in phase with the output of the local oscillator.

If the signal approaching the loop is coming from a direction which is to the left of the null, the loop voltage will be 180° out of phase with the vertical antenna voltage and the resultant modulation envelope will be 180° out of phase with the output of the local oscillator. These two alternate conditions provide a means of controlling the motor of the loop so that it will turn the loop in such a direction that neither of the conditions exists—so that the loop voltage is zero and there is no forty-eight cycle modulation of the radio signal at all.

The loop motor which is to be controlled is a special low inertia, two-phase induction motor operating on a 400-cycle current, the high frequency current being used in conformity with present aviation practice of cutting down on the hardware whenever possible. And the difference in the amount of hardware required to handle sixty cycles and that for four hundred cycles is considerable.

Two Type 2051 thyratron control tubes are used to control the current applied to the loop motor. These are gas filled, screen grid tubes capable of passing relatively large amounts of current. But the current to the motor does not pass directly through them. Saturable reactors, as shown in the diagram, provide the link between the thyratrons and the motor. Take note of the position of these reactors in the circuit and we'll get around to their function in a minute.

The forty-eight cycle output of the superhet receiver is coupled directly to the grids of the two thyratron control tubes. The plate of each thyratron leads to the primary of a saturable reactor and the two reactors have a common terminal through which the plate voltage to the thyratrons is applied. But in order to reach the thyratron plates this voltage has to pass through a tube called the cathode follower and is made to behave very strictly because a portion of the forty-eight cycle output of the local oscillator is coupled to the grid of the cathode follower.

Electrons may flow from the cathode of the thyratron to the plate, through the reactor primary, to the cathode of the follower tube, then to its plate and so back to the positive source of supply. But they can only do so in forty-eight cycle pulses because the grid of the cathode follower tube is a gate that opens only at such intervals to let them through.

Likewise, the thyratrons themselves will pass current only in forty-eight cycle pulses because they operate in a similar fashion. But note that the grids of the thyratrons are connected to the opposite ends of a transformer secondary whose center is returned to ground. That makes the thyratron grids out of phase with each other. When one is maximum positive, the other is maximum negative and vice versa.

We now have forty-eight-cycle pulses appearing on the thyratron plates which are in phase with each other and controlled by the local oscillator. We have a forty-eight-cycle frequency appearing on the grids of the thyratrons, which are out of phase with each other. If the plate and the grid of a thyratron are positive at the same instant the tube will fire, plate current will flow through that tube. Under no other combination of circumstances will it do so.

If the first condtion we discussed previously exists, in which the received signal is from the right of null, the grid of Thyratron 1 will be in phase with the voltage on the plates, and the tube will fire, but the grid of Thyratron 2 will be out of phase and will not fire. When the condition is reversed and the signal approaches from the left, the modulation envelope will be out of phase with the local oscillator which will place the grid of Thyratron 2 in phase with the voltage on the plates and *that* tube will pass current.

We now have available in the two reactor primaries a reversible current whose direction is controlled by the position of the loop antenna with respect to an approaching radio wave. All that remains to be done is apply this current to the loop motor and the circuit is complete.

Since our control frequency is only forty-eight cycles per second and the motor is operated from the customary four-hundred-cycle power supply, some means must be provided to bridge that gap between the two frequencies.

An actual bridge is, in fact, used. See Figure 4 and Figure 2. The bridge is composed of the two halves of the power transformer secondary and the two reactor secondaries. One coil of the two-phase motor is connected across the midpoints of this bridge. When neither thyratron is passing current, the reactors offer an equal and very high impedance to the four-hundred-cycle current so that none flows through the motor winding because the bridge is balanced. If, say, Thyratron 1 fires, however, Reactor 1 becomes saturated and its impedance becomes greatly lowered. This unbalances the bridge and four-hundred-cycle current flows through the reactor, secondary through the motor winding, and back to the power transformer. The current will flow and the loop motor will turn as long as the thyratron is passing current. The thyratron will pass current as long as there is a forty-eight-cycle voltage on its grid which is in phase with the voltage on the plate.

But the loop motor is turning the loop towards the null, and when that point is reached the loop signal will become zero and there will be no forty-eight-cycle modulation of the carrier. The voltage on the thyratron grids will disappear and the bridge circuit will be balanced again with the end result that current will be cut off from the motor winding and the motor will stop with the loop in the null position.

All that's needed now is a means of transmitting an indication of the position of the loop on the outside of the ship to the pilot or navigator inside.

In the manual installations the shaft of the loop was simply extended to the operator's position and carried a graduated scale that rotated against a pointer. Determining a null by this means becomes a difficult feat in the cramped quarters of high-speed aircraft.

A flexible cable is impractical because of its inertia and difficulty of proper installation. The solution exists in a self-synchronous motor system.

One adaptation as used in many types of remote indicators is commercially termed the Autosyn System. It is used in remote indications of fuel flow and pressure, flap and tail wheel positions and numerous others beside the radio compass.

Each system is composed of an Autosyn transmitter and an indicator. Both units are similarly constructed with a rotor and a stator. The rotors are energized and a particular combination of voltages is induced in the three winding stators. The voltage combination depends on the position of the rotor. When transmitter and indicator are connected and the two rotors occupy the same relative position, the voltages in the stators are equal and opposite and no rotation results. When the rotors do not occupy the same position, however, the stator voltages are not alike and there is a rotation until the voltages balance again.

With this indicator providing an accurate reading in degrees on a panel dial, the radio compass is complete.

Obviously, the design and engineering of the automatic radio compass is an intricate thing that goes far beyond this simple explanation, and it is an excellent example of the magnificent complexity arising out of the permutations and combinations of only the simple electrical factors of resistance, inductance, and capacity and the devices of tubes, condensers, resistors, coils, and transformers.

Navigation through use of the radio compass is a separate science in itself. An indication of two of the major uses of the instrument will indicate something of the methods involved.

The first and simplest use is that of homing, simply flying towards a known transmitter. The station is tuned in and the heading of the plane is adjusted so that the indicator needle is on zero. If wind drift is present, this will cause the plane to follow a curved trajectory, but if this is not objectionable, no other consideration need be given it. If a straight line path is desired, the wind-drift angle can be determined and the plane headed into the wind by maintaining this drift angle on the radio compass. The resultant path will be a straight line.

Perhaps an equally common use of the radio compass is the determination of position when it is not particularly desired to home into a station location. The plane continues along its desired course and two, preferably three, bearings are taken on radio stations of known locations. On a chart, lines are drawn through the positions of the stations and at the angles to the meridians as determined from the radio compass in conjunction with the magnetic compass. The lines should interesect at a single point which indicates the location of the plane at that moment. Due to the velocity of the plane or vagaries of radio transmission the lines normally produce a small triangle instead of a point when three bearings are taken. The ship location is plotted at the center of this small triangle.

Another adaptation of the compass involves the use of two complete compass circuits whose indicator needles are mounted on the same dial. This makes navigation between two radio station locations very simple. One compass is tuned to each of the two stations and as long as the indicators are in a straight line with each other the plane is on a line between the two stations. If the plane deviates, the needles will form an angle between them. To return to the proper course, the plane must fly away from the direction of the acute angle formed by the pointers.

At the battle fronts today, untold numbers of ships and crews have been saved by the automatic radio compass when other means of navigation failed. It is obvious that the navigating facilities offered by the compass are vastly superior to the primitive homing instincts of the homing pigeons, remarkable as *they* are. It is not likely that the pigeon is able to take a bearing during flight and be aware of his exact location. Or is it? At least the problem of locating an alternate roost and homing towards it probably gives the bomber a distinct edge.

The aero historians will probably continue to be right, for mere copying of nature does not lead very far in mechanics without vast improvements being added.

THE END.

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Alter Ego

by A. BERTRAM CHANDLER

The weapon was of terrible potency—with a most curious backfire. It had the strange property of satisfying two wishes at once: the destruction of an enemy and—

Illustrated by Williams

Is there time?

At first, it was only a little voice at the back of Quentin Dale's mind, but, as he worked with cold desperation, his fingers hampered by the thick gloves of his spacesuit, it seemed to swell to a mighty roar.

IS THERE TIME?

Now the very stars were shouting it, and the jagged, contorted rocks that made the barren landscape of the little world on which his ship, *Red Star,* had crashed.

Doggedly, he worked on, forcing himself not to look up from his blueprints, his makeshift tools, his even more makeshift materials, to scan the black sky for the fast approaching cruisers of the Aryan Navy.

For there was more than the life of Quentin Dale at stake, far more than the continued existence of one, hitherto obscure, officer of the Free Martian Naval Intelligence. For, unless Dale delivered to his superiors the plans of the weapon that he was now trying to assemble, the Free Martian Republic would be blasted from the surface of its arid world and the Crooked Cross wave over every world of the System.

"A magnet—" muttered Dale.

"Where can I find one? Ah, the converter, of course!"

As he straightened his back, the reaction of the effort sent him flying many feet up and away from the surface of the tiny planetoid. Dale cursed at the delay as he drifted down with nightmare slowness. At last his feet found solidity, and he shuffled painfully toward the twisted wreckage of what, but a short time before, had been the finest, fastest, rocketship in Space. He—

"Still at it, George?" asked Third Officer Tom Black.

"Yes, Tom." George Whitley let his fingers fall from the keys of his ancient, portable typewriter. "You've interrupted me at an awkward moment, blast you! My bold hero is just about to assemble his secret weapon out of the junk pile which, but five short seconds before, was the finest and fastest rocketship in the whole Solar System. Let him wait, anyhow. He needs putting in his place, and there's time for at least one gin before dinner."

"Thanks. What do you think I came in for? Here's hoping that your bold hero tickles the fancy of the editor of *Stellar Stories!* But what did you mean when you said he needed putting in his place?"

"I didn't— Oh, you mean that awful twirp Quentin Dale?

"Well, every author, now and again, gets to the point when he downs tools and says to his characters: 'Say, listen! Who is writing this story, me or you?' Sometimes the cows seem to develop completely independently of your intentions, Heaven knows why."

"But there must be some reason."

"I suppose so. Hm-m-m. How's this? Suppose that, by some chance, you hit upon some facet of your own character, or perhaps 'persona' is the better word, that's buried in your subconscious. You dig it out, and it expands, develops— Why not?"

Black refilled his glass. "Very ingenious, for a Second Mate. Reminds me of a case of schizo-whatsit. You know, dual personalities, and all that. But it will only apply to the authors of normal, respectable fiction."

"Why?" demanded Whitley, not without indignation.

"Just this. Conan Doyle may, quite easily, have had a submerged self who was a great detective. Or Chesterton, or Wallace, or Van Dine. But how does the poor man's H. G. Wells dredge up astronauts from his subconscious?"

"Gin stimulates the brain," said Whitley slowly. "At least, it stimulates mine." He took a man-sized swallow of cerebral stimulation. "Ah, got it! J. W. Dunne, and all that!"

"What's J. W. done?"

"Don't be funny. You've read 'An Experiment With Time,' of course? No? Then it's high time you did. Anyhow, Dunne tries to prove that, during sleep, the old subconscious is liable to wander ahead along the fourth dimension. Time to you, and that, in consequence, one dreams premonitory dreams. You can regard your world line as the four dimensional track along which your spark of consciousness travels from the cradle to the grave. But, says Dunne," he assumed the air of one imparting a vital secret, "*it takes time to do this!*"

"So what?" demanded Black.

"Sorry, my own spark of consciousness seems to have jumped the track. It's all very involved and complicated. But I should imagine that if you take advantage of the potential immortality of the germ plasm, in other words, if you have children, your world line will be prolonged into the infinite future. Get the idea?"

From somewhere not so far away came dull, heavy thuds, felt rather than heard. The two officers looked at each other in silence, each asking the same, unspoken question.

"Depth charges," said Whitley at last. "Probably," he added, without conviction, "the escort putting the fear of God into the stragglers."

"Hope you're right," replied Black, unhopefully. "Well, thanks for the party, George." He glanced at his watch. "I'd better be getting up top to relieve old Picasso for his dinner."

Whitley had another gin with Picasso, otherwise Mr. Claude Jenkins, Chief Officer, when that worthy came down from the bridge for his evening meal.

George Whitley was sleeping.

Dimly, the alleyway light shone through his thin door curtain, revealing the details of his room—the inviting bunk with its clean, white sheets and pillows, the blue silk pajamas neatly folded at its head. But, fully clothed, Whitley was sleeping on his settee. Ready to hand were his short Wellington boots, his life jacket, and his "panic bag," this latter containing such little comforts as its owner deemed necessary for an open boat voyage.

The long, thin form twitched violently.

George Whitley was in the throes of a nightmare.

As he straightened his back, the reaction of the effort sent him flying many feet up and away from the surface of the tiny plantoid. Whitley-Dale cursed the delay as he drifted down with nightmare slowness. At last his feet found solidity, and he shuffled painfully toward the twisted wreckage of what, but a short time before, had been the finest, fastest, rocketship in Space. He couldn't help grinning to himself as, through sheer force of habit, he used the air lock instead of entering by any of the half dozen gaping apertures in the hull of his vessel.

Minutes passed while he removed the casing from the converter, more minutes passed whilst he fumbled among its intricacies for the little, bar magnet, and, all the time, that voice at the back of his mind was screaming—*'IS THERE TIME?'*

But at last he had what he wanted, and no positron blast had come screaming down from the black sky.

And then, he was making the last touches to his weapon, the weapon that was to have meant the end of free men, everywhere, but which would now mean that government of the people, by the people, for the people, would not perish.

Against the black backdrop of Space tiny points of light appeared, the Aryan cruisers lifting over the rim of the little world. Cruisers? But surely that was a battleship of the "Herman Goering" class? *"I must be important,"* thought Whitley Dale. *"I'll take the big fellow first."*

The sights of the weapon were crude, as was the weapon itself. It resembled nothing so much as a rather symmetrical spider's web of wire mounted on a rough tripod. But it worked. Surprisingly, there was no flash, no indication that power from *Red Star's* emergency batteries was being fed into it. At first, Whitley-Dale feared that, after all, it was not working. Then he became aware of a sense of almost intolerable strain, a feeling that the very foundations of Space and Time were built upon shifting sand. He swung the weapon a little to the left, obviously his estimated deflection was a little out, or, perhaps, his sights were far from accurate.

"Herman Goering" dissolved into a vast cloud of impalpable dust as the intangible bonds that bound molecule to molecule within her huge structure were abruptly loosened.

"Next, please!" shouted Whitley-Dale, his voice within the helmet of his spacesuit a giant's bellow. He felt like a giant.

But his makeshift materials, his hasty construction, could stand just so much. The sense of strain became intolerable, then something snapped. The weapon disintegrated into a puff of metallic dust and Whitley-Dale spun down, down, and down into a black vortex to a horrid, shrill clangor of bells.

A dim spark of consciousness stirred in Quentin Dale's brain. He was, he realized, lying supine on something soft. His spacesuit had been removed. About his body he felt the texture of unfamiliar clothing.

"I'm not dead," he thought. *"I must be a prisoner."*

He realized, suddenly, that the urgent clamor of alarm bells was still in his ears. He opened his eyes, found himself in what appeared to be a ship's cabin. But the dim light that penetrated the thin curtain screening an open door convinced him that this was no prison cell aboard an Aryan cruiser. But where was he? His surroundings fitted nothing in his whole experience. Beneath his feet, for he had, by now, risen to a sitting posture, the deck gently rose and fell.

From somewhere outside came shouts, the thud of distant, heavy explosions, and frequent short, staccato bursts of sharper detonations.

Automatically, Dale pulled on a pair of short boots, thrust his arms into the sleeves of a gold-braided jacket. Some instinct seemed to propel him through the open door into a short alleyway, and then through another door to the open air. The cold darkness was abruptly shattered by the hard, white brilliance of some kind of aerial flare. By its light he made his way up a ladder to a sort of open platform.

Before the flare died he saw the strange shapes of what appeared to be weapons with their crews crouching behind them. Then, from all sides, the shadows rushed in. It was very dark.

Out of the darkness came a voice, deep and rich, the voice of one accustomed to command.

"Is that you, Whitley?"

Dale made a noncommital noise.

"Good. Mr. Black has gone aft to his six-inch blunderbuss, so you'd better hold the fort up here." Feet clattered up the bridge ladder. "Ah, here are the others. Keep a lookout on the port side, Mr. Jenkins. Mr. Holmes, stay here with me. You'd better make sure that all the secret papers are ready for dumping, Mr. Whitley."

"Ay, ay, sir!" said Dale, automatically.

"Why did I say that?" he wondered. *"Why am I talking, and understanding, archaic English? But something in my mind seems quite at home here, wherever 'here' is. I'd better let Nature take its course till I get the hang of things."*

His subconscious mind seemed to take charge. His feet—or were they Whitley's feet?—carried him round all kinds of half seen obstacles into a dimly lighted room. The first thing to attract his attention was what appeared to be a calendar. It was. He looked, unable to believe his eyes.

And then, standing in the middle of the chartroom, he uttered words and combinations of words with which the white-painted bulkheads were already quite familiar, and words and combinations of words which the passage of five centuries will add to Man's vocabulary. All the evidence at his disposal led him to one, irrefutable fact—he had been thrown back five hundred years in Time.

Luckily, when George Whitley created Quentin Dale he created a first cousin to the superman. But did he create Quentin Dale? Was Quentin Dale dredged up from his own subconscious, no more than the hitherto submerged half of a case of split personality? In that case, where did Quentin Dale get his technical knowledge from. But let's get on with the washing.

Dale's first concern was to get things straightened out. The high-powered brain got to work. Obviously, the disastrous failure of the decoherer was to blame. But how? True, there had been the sense of strain experienced during its operation, but Dale knew enough of the theory of Time Travel to know that (a) it was impossible and (b) the mechanics of the decoherer fitted in with none of the orthodox lines of approach. Yet another new weapon used by his enemies? Dale smiled grimly. *He* would have known of that.

Chance supplied the correct answer to the question.

As Dale, who had been resting his elbows on the chart table, straightened his back, he found himself staring at his own reflection. The chartroom windows, backed as they were by wooden blackout screens, made a mirror of sorts. But—*it wasn't his own reflection.*

Instead of the familiar, pale-blue eyes, dark-brown ones stared back at him. The head was topped with black hair, whereas he had been of an almost ashen blondness. The face was utterly dissimilar, long and lean and far from cheerful looking. Yet, was it so dissimilar? There was a certain haunting familiarity, it could be the face of a long dead and gone ancestral Dale.

Quentin Dale wished that he had read and studied more of Malinowsky's works on the Race Subconscious, here, he was convinced, lay the answer to the question. Yes, something on those lines would explain the feeling he had had that he was sharing somebody else's brain, a somebody buried just below the surface of his own conscious mind, and, this was the most frightening part, a somebody who might return to take full charge at any moment.

But there was work to do.

Dale concentrated on this business of secret papers, then let his mind go blank. Once again, Nature took its course, and he found himself with his hands on a large, weighted bag. Good. With one, swift movement he upended the bag over the table, then, with the practiced fingers of a master spy, began to shuffle through the contents.

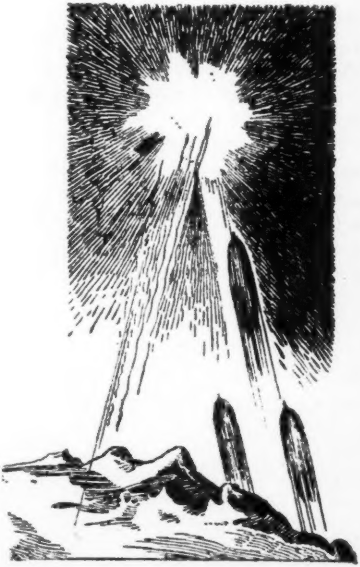
Everything was there. In an incredibly short space of time Dale had imprinted on his mind a quite accurate picture of the state of affairs prevailing in the twentieth century world. He knew who was fighting who, and he knew what weapons were being employed by both sides.

An official looking letter demanded his attention.

". . . the success of the whole campaign depends upon the maintenance of supplies . . .

". . . the convoy *must* get through . . .

"The convoy must get through—" repeated Dale, unconsciously stiffening to attention. Stirring times— Perhaps even now he could make use of his hard-earned



knowledge. But could he remember?

The germ of an idea began to develop in his mind.

"What do you think you're doing, Mr. Whitley?"

Quentin Dale spun round.

A small, stout man was standing in the starboard doorway, obviously the owner of the voice that had addressed Dale out of the darkness. He was attired in a blue uniform with four gold bands on each sleeve, and the peak of his cap was crusted with gold.

"What are you staring at, man? Anyone would think that you had never seen me before, or that I had suffered 'some sea change, into something rich and strange.'" With his last words, his voice took on an organlike quality.

Dale played for safety, and, once again, made his noncommital noise.

"I don't know what modern officers are coming to!" exclaimed the brass-bound individual. "They send me here, and what do I find? A Chief Officer who should have been a ruddy artist, a Second Officer whose only literary diet is blood and thunder and popular science, and who spews up the half digested results on to sheets of virgin typewriter paper. And then, when he should be doing a vitally important job, he moons around the chartroom thinking up plots for his next epic. *Pah!*"

Dale's training as an Intelligence Officer stood him in good stead.

"I was looking for the C.R.S.3, sir," he lied, smoothly.

With a bellow, the Captain dived into the pile of paper.

"Here it is!" he shouted triumphantly. "Right under your ruddy nose!"

"Thank you, sir." Dale busied himself putting the papers back into the bag.

The little man's anger seemed to have evaporated. Perhaps he was only playing a part, the part of an irate sea captain.

"Well, Whitley," he said, "the fun and games seem to be over. Black reckons that the poor old *Karangala* caught it; anyhow, it was somebody out on the starboard quarter who was torpedoed.

"You know," he went on, "I'm getting tired of this war. We all are."

He struck an attitude, and declaimed:

" 'Tomorrow, and tomorrow, and
tomorrow
" 'Creeps in this petty pace from
day to day
" 'To the last syllable of recorded
time.'

"That's what it feels like, Whitley. As though we've been at war all our lives, and will be at war all our lives. One long round of strain, worry, station keeping, fog, ice.

" 'And all our yesterdays have
lighted fools
" 'The way to dusty death.'

"Or should it be 'watery death'?" He lapsed into silence.

"Well, Mr. Whitley, it's late. I'll

write up my night orders and turn in.

"'To sleep: perchance to dream:
ay, there's the rub—'"

"But I shan't dream much tonight. Here you are."

He pushed a small book across the table to Dale.

"Course and speed to Commodore's orders—" he read. "Call me at once in the event of enemy activity or any deviation from normal routine. J. Taylor, Master."

Before Dale signed, he surreptitiously turned back a page to see what his own, or Whitley's signature was supposed to look like. Also, he wished to satisfy himself as to the names and rank of the other officers.

A diminutive, brassbound youth entered the chartroom, bearing a large teapot.

"Will you have your tea up here, sir?" he asked the Captain.

"No, thank you, Watkins. I'll brew myself a mug of cocoa in my room. Good night, Mr. Whitley. I hope you have a quiet watch. I shall be on my settee if you want me."

"Shall I pour out yours now, sir?" piped the cadet—for that, Dale decided, must be his rank.

"Yes, please, Watkins." He glanced at the clock. 2345. That meant, probably, that he was on watch at midnight.

As he gulped the last of his tea he heard the, to him, unfamiliar sound of helmsman and gunners being relieved. A bell rang sharply, for a moment he feared that it was the alarms again. But it appeared to be only a telephone bell. After a moment's hesitation he put his empty cup down on the tray, then made his way out into the windy darkness.

He finally found Black on the lee side of the bridge, propped against the telegraph.

"'Say,'" declaimed that worthy, in sepulchral tones. "'What, is Horatio there?'"

"'A piece of him,'" replied Dale, with more truth than Black guessed.

"So you've been swotting up your 'Hamlet,' George, to try to get into Pop's good books! I'm surprised and pained."

"They were very keen on Shakespeare at my school," explained the Free Martian, omitting to add that Shakespeare was one of the links binding them to the world to which they all hoped, one day, to return.

Then Black delivered himself of a long string of utter incomprehensibilities.

"She's turning eighty," he said, "to make thirteen point five. She's right abeam of old dimwit now." Dale peered into the darkness, and could just make out a black shape that might have been half a mile distant. "He wasn't bad, this last watch Black continued. "I think he must have given his engineers a good bottling. I haven't been above eighty-three, or below seventy-nine. She's averaged eighty-one point six.

"Oh, the course. North seventy east true, ten degrees westerly error, makes north eighty east compass on top. It's north seventy-seven east down here, but I'm steering eighty to keep her in. Have you got her?"

"I suppose so."

"Not very enthusiastic, are you George? Sorry I had to ring the alarm bells and get you all up, but it couldn't be helped. It looked as though just one sub managed to slip through the screen. He got *Karangala,* and the escort got him. I wish I could have had a shot at him with old Betsy—"

"Oh, by the way, the Mate asked me to ask you to tell your dog to gibe him an especially good shout at one bell. That's all, I think. I'll write up the log and retire to my virtuous couch. Night night!"

"Tell my dog—?" puzzled Dale, pacing up and down as he worried. He had far more important things to worry about, but even his superman's mind was not immune to little, essentially human, illogicalities. "Tell my dog—?" Abruptly, he found himself in a compartment in which an elderly man stood peering intently into a dimly lighted bowl, his hands grasping the spokes of a polished, wooden wheel.

"Mr. Whitley, sir," he complained, "I wish you'd get your cadet to give her a drop of oil. She's squeaking something terrible, she is, and that stiff I can hardly get the wheel over. The oil can's not in its proper place, sir, I looked when I came on watch. But young Wilde, he knows where it is. I saw him using it yesterday afternoon."

"Wilde!" called Dale.

A tall, thin lad entered the wheelhouse, wearing a uniform similar to that in which he had seen Watkins. A cadet, obviously. Possibly the mysterious dog.

"Find the oil can, Wilde, and give her a drop of oil!"

"Ay, ay, sir."

"And put it back in its proper place, in future."

"Yes, sir."

"I should imagine," thought Dale, *"That the functions of a cadet will have changed very little throughout the ages. I sincerely hope that I'm right."*

He wandered outside. It seemed to him that the black shape to starboard was much closer, also that it had changed its relative bearing. The most annoying part of it all was that the obvious orders he should have given were on the tip of his tongue, just below the surface of his conscious mind. He knew, somehow, that, in an emergency, he would automatically do and say the right things. But this knowledge was of little comfort at the present moment.

Then, from the bridge of his next abeam, a very dim, blue light began to flicker.

"Wilde!" shouted Dale.

"Sir?"

"Here's some signaling practice for you. See what he wants."

From somewhere the cadet produced a night signaling torch. Finally, the light aboard the flagship flickered out for the last time.

"Well, what does he say?"

"Five cables please, repeat, please."

"Hm-m-m. What do you reckon our distance off is?"

"About two and a half cables, sir."

"Good. And we are steering . . . er . . . eighty down here. If you were me, what would you do?"

"The course should be seventy-seven, sir, so I think I'd pull her out to seventy-four till I was back on station."

"Hm-m-m. Good enough. Pull her out to seventy-four, Wilde, and let me know when you think she's the correct distance."

The cadet called into the wheelhouse: "The Second Mate wants you to steer north Seventy-four east, Birkett."

Dale began to feel greatly relieved.

"Now, Wilde," he remarked, "would you say that, apart from being too close, she was in station?"

"No, sir, she's a little astern."

"What would you do about it?"

"Well, sir, she's turning eighty now, so I'd put her up to eighty-two."

"Would that be enough?"

"Er . . . no, sir. I think you're right. The Commodore seems to be forging ahead quite fast."

"Put her up to eighty-four, then, and let me know when you think she's right."

Wilde went to an instrument that Dale had been almost sure was some kind of communication instrument, but to where, he had no idea.

"Up four to eighty-four, please," he ordered.

So the watch was passed, the Free Martian ostensibly testing the knowledge of his cadet, but, in reality, using the lad's practical experience to supplement the quite extensive theoretical grounding that he had gained from his hasty perusal of the secret books and papers.

Finally, at about 0340, the one little mystery that still bothered Dale was solved.

"Shall I call the Chief and Fourth now, sir?" asked Wilde.

"Yes. Give them a good shout."

So Wilde was the dog.

Quentin Dale managed to hand over the watch without arousing suspicion. The Chief and Fourth Officers were both far too busy getting their mugs of strong tea to notice any subtle difference in George Whitley, or to take more than a purely academic interest in the convoy.

As soon as he could, Dale went below. By this time he had a good working knowledge of the geography of the bridge and was able to regain his own room without barking his shins more than twice.

Before he dared sleep, and sleep was the one thing he craved, there were things to do. First, he had to get some idea of Whitley's personality. As an Intelligence Officer, he was used to prying, but even so, he found the reading of another man's private papers definitely abhorrent. But, after all, I'm using his body, he told himself.

The result of his investigations was even worse than he had feared. Whitley was married. That, in itself, was sufficient embarrassment. But in addition, he had a girl friend in New York, two in New Zealand, three in Australia and one in Capetown. Looking at their photographs, Dale decided that he would like to meet them all one day, but not collectively.

A folder full of typewritten pages received only a cursory glance. It showed Dale what his hobby was supposed to be, but he had no time, now, to read any of Whitley's stories.

Next, the bookshelf drew his attention.

It almost broke Dale's heart to have to ignore the novels, the works on sociology and history, but he had to concentrate on the technical books. Luckily, they were all there: Navigation, Seamanship, Meteorology, Shipmaster's Business.

When the steward brought in the Second Officer's morning tea, Dale, still seated at the desk, felt confident that he could, if necessary, pass for Extra Master.

One of the seamanship books Dale had read might have been written for the benefit of those in similar circumstances. For reasons best known to himself, the author had wasted quite a few pages on sea routine. Had it not been for this, Black would have gone hungry, for the Free Martian would never have guessed that he was supposed to relieve the bridge for breakfast. However he assumed that, as the senior, he fed first, and, full of ham and eggs, climbed the ladders to the bridge.

"In a hurry to get down at four, weren't you?" Black greeted him.

"Not especially. Why?"

"You forgot to write up your log, that's all. You'd better do it now, before Pop comes up and noses around the chartroom."

Dale found a large, flat book labeled "Log".

But what did he put in it?

However, the remarks for midnight and 0800 were a guide. The barometer, he assumed, wouldn't have altered much between 0000 and 0400, neither would the air temperature. She must have done about the same speed for his watch as for the others, that took care of the patent log. The weather must have been about the same. "Slight to mod. sea," he wrote. "Low swell. Overcast. Clear." In short, he cooked it. But nobody would ever be any the wiser.

The weather was still overcast, so he had no opportunity to shoot the sun with the primitive sextant and obtain a Position Line. However, he felt confident of his ability to run up a perfectly good Noon Dead Reckoning. After all, in his other life he was qualified to navigate in three dimensions.

Black returned. Dale went inside to wind the chronometers. *"What perfect museum pieces,"* he thought. *"Wouldn't old Bergenstrom love them for his collection—"*

Having finished his routine work, he browsed through the secret papers once more. It was then that

INNOCENT VOYAGE TO DISASTER

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Be sure to read the exciting novel, CARGO UNKNOWN, in the April issue of

DOC SAVAGE

AT ALL NEWSSTANDS

the idea which had been slowly germinating in his mind for the last few hours blossomed forth in all its glory.

"Why not?" he asked himself. *"Why not?"*

"It is obvious that this is a vitally important convoy. Perhaps in the past, my past, the convoy didn't *get through. Perhaps its failure to deliver supplies just tipped the scales in favor of an Aryan victory.*

"Now"— he busied himself with dividers over a small scale chart—*"in a day we shall be well inside the range of shore based bombers. It's obvious that the Aryans, or the Nazis, as they seem to call themselves now, will do their best to wipe us up. What can* I *do about it?"*

With his mind's eye he saw a blueprint, the blueprint he had stolen from the Chicago Arsenal.

"That's it!" he told himself. *It'll get this convoy through and, in any case, it will mean that the United Nations will win hands down. But can I make it? I've got no palerium, but copper* should *do—"*

A little later, the Third Engineer was talking to the First Electrician.

"They're all nuts on deck," he declared, "from the Old Man down. You should have seen the list of stuff that the Second Mate wanted the loan of—he sent young Wilde along just now. Maybe he's making a rocketship."

"I know," sympathized the Electrician. "He's borrowed my soldering iron, too. Rigging up limelight for Pop's stage, probably."

Meanwhile Quentin Dale was busy assembling, for the second time, the Aryan's secret weapon. This time, he felt sure, it would work well. There wasn't the same desperate haste, and his fingers were not hampered by the heavy gloves of a spacesuit.

Dale sat at his desk, busy with pencil, scratch pad, and tables. He wasn't quite happy about the copper wire. If only he had the data—He reached up to Whitley's bookshelf, in the hope that Hogben's "Science For The Citizen" would meet his requirements.

Entered Tom Black.

"What, ho, George. And how's Quentin Dale?"

Dale started violently, dropping the book.

"How did you know," he gasped.

"Why the guilty conscience? Have you decided to do away with the poor cow? A pity. I rather liked him."

"Well," admitted Dale, "his existence just now *is* rather, shall we say, redundant. After all, he has no real place here and now."

"What does that matter? As long as you keep him in his place, why worry? Or are you thinking of trying Time Travels? You know, George," he went on, "there's one point where you blokes always slip up. You have somebody traveling back in Time, and he immediately starts playing merry hell with his environment by making all kinds of fancy gadgets peculiar to his own day and age. But it can't be done."

"How did you know?" asked Dale, again.

"Oh, so you are, are you? Quentin Dale changes history, I suppose. Well, here's the rub. Suppose I'm a"— he groped for a word—a "Frenchman. I'll naturally be brought up with the idea that if Napoleon had won the Battle of Waterloo it would have been a good thing. Now I, with my good, though I say it who shouldn't, working knowledge of the Lewis gun am sent back in Time. I decide to do Perfidious Albion a bit of no good, and supply Napo. with M.G.s. But can I make one? There just aren't the materials or the tools to make either the guns or the ammunition."

"But this will work," said Dale, quietly.

"What *are* you talking about?"

Luckily, at this moment there came a tap on the door.

"Yes?" sung out Black.

"Captain's compliments, gentlemen, and will you join him in a gin before dinner?"

"Command performance!" said the Third Officer. "But come, and let us see 'the Drury Lane Dane slain'!"

Standing on Captain Taylor's table was a beautiful little model, a toy stage, complete with curtains and footlights. On the desk, a few feet away, were what appeared to be all the apparatus, in miniature, to produce any desired lighting effect.

"What shall it be this evening, gentlemen?" asked the Captain, dispensing gin, lime juice and bitters. "Let me see, we did 'Macbeth' last, didn't we? Ah, come in Wilde. A lemonade for you, young man. I wish we could abandon the old Elizabethan custom of having the female parts played by boys. Somehow, I just can't imagine Wilde as a tragedy queen.

"What about 'Hamlet'? Mr. Jenkins has kindly made me some new scenery and some new characters—to my specifications, of course." He fumbled in a large box. "Now, what do you think of this?"

The two officers and the cadet stared at the beautifully made and costumed little figure. At last, "Isn't he just a little gloomy for Polonius, sir?" asked Black.

"Polonius, Polonius!" Taylor made the name sound like a malediction. "You see a fat man, so, at once, your enfeebled wits must have it that it is one of the Immortal Bard's comic creations. Read your Shakespeare, Mr. Black, read him carefully, all of you. And what authority do you find for the all too prevalent assumption that the Prince of Denmark was a long, thin streak of misery? None, sir. On the contrary, does not the Queen say, in Act Five, Scene Two, 'He's fat, and scant of breath'?

"There, friends, you have the essential tragedy of Hamlet. A fat man, not blessed with the nature that so often seems to go with that build, but gloomy and introspective. None will take him seriously; none, that is, but the poor, mad Ophelia. Small wonder, then, that such a nature turns and feeds upon itself.

"But we will set the stage for the

first scene of the tragedy."

With his pudgy, but surprisingly deft, hands he set up scenery cunningly cut from plywood. In the background, frowned the battlements of the royal castle at Elsinore. Front, left, Taylor placed a small, gaudily comparisoned figure armed with a long halbred. He made adjustments to his miniature footlights then switched off the lights of his room.

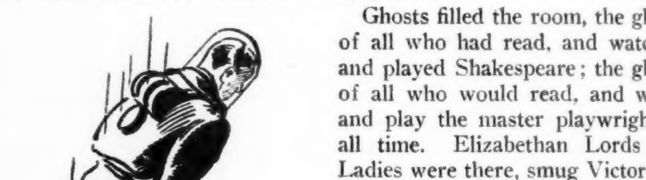
Abruptly, the scene ceased to be make-believe. The dim radiance from the front of the stage simulated the light of a waning moon; and the little manikin that was Francisco at his post seemed to shift and stir uneasily.

"You take Francisco, Black, and then Marcellus. Whitley, you can take Bernado. I will take Horatio and, of course, the Ghost. Here, you'll need these—" He handed out little paper-covered volumes of "Hamlet". Dale found that just enough light came through the curtained ports to enable him to read the small print.

The play proceeded.

Ghosts seemed to fill the room with their almost tangible presence. Only the tiny, brilliantly lighted stage seemed real, all else was illusion. Tableau succeeded tableau, and the words spoken by the four who were at one players and spectators seemed to come from—Outside.

Ghosts filled the room, the ghosts of all who had read, and watched, and played Shakespeare; the ghosts of all who would read, and watch and play the master playwright of all time. Elizabethan Lords and Ladies were there, smug Victorians, the tortured generations of the Interregnum. And mingling with them were ghosts who had no place on Earth, the spirits of those millions of the Martian colonists who had looked upon the Bard of Avon



as the symbol of the world to which they would one day return.

Dale remembered, vividly, the last time he had seen "Hamlet" played. It was at New Stratford, at the Shakespeare Memorial Theater. Boris Feodoroff had produced it, Etienne Giraud had played the lead. Yes, it had been great. But, somehow, this little toy stage with its little toy actors seemed more real than any detail of his past life.

What else had he seen? There was that fantastically surrealist production of "The Tempest". Unbidden, the lines came into his head —"We are such stuff as dreams are made on, and our little life, is rounded with a sleep—"

"We are such stuff as dreams are made on—" he whispered. Suddenly, the pieces of the puzzle fell together in his mind. He knew that if he were to read Whitley's manuscript, he would find therein his own name, his own life. Was this all that he was, then, the phantasm of the disordered imagination of some poor scribbler striving vainly after a perfection of style that he would never reach?

How did it go?

"All the world's a stage, and all the men and women merely players?" Something like it, anyhow. And if he were just a player conjured up from nothingness for the delectation of Whitley's hypothetical public—then he would play his part to the best of his ability.

And all the while—he was now playing Rosencrantz—he responded automatically to his cues.

Finally Black, who was speaking for the miniature Polonius, hissed in a conspiratorial whisper—" 'I hear him coming; let's withdraw, my lord.' "

This was Captain Taylor's big moment. He rose to his feet, struck an attitude of tragic indecision. He cleared his throat. But, before he could begin, Dale, still in his reverie took the cue.

" 'To be, or not to be: that is the question—' " he began. " 'To be, or not to be—' " he repeated, slowly.

And then, the clamor of the alarm bells shrilled throughout the ship.

"Saved by the gong!" shouted the irrepressible Black.

Low and fast, in line ahead formation, the bombers came in. Low and fast, they roared in from the darkling east, themselves poor targets against the dusky sky but with the convoy silhouetted against the afterglow.

From the ships came the bright orange flashes of exploding cordite, puffs of dirty white-brown smoke, as the long range weapons took up the challenge. Then, above the barking of the high angle guns was heard the frenzied rattling of the automatic weapons as the range rapidly closed. The sky was alive with tracer.

Black, as Fire Control Officer, had run to his telephone and was shouting into the mouthpiece. "twelve pounder, barrage commence! Oerlikons, hold your fire till I give the word!"

From the poop came the ear-piercing yelp of the little high angle gun, and puffs of black smoke from its bursting shells were added to those already stippling the sky.

" 'Gun upon gun, huzzah!

" 'Don John of Austria has loosed the cannonade!' " said Dale to himself as he raced for the short ladder leading to the monkey island. In a few moments, Don John could take his obsolete guns and—

Yes, there stood the weapon, balanced on its tripod of brass curtain rods like some spider's web of copper wire. But strange flies were caught in this web, a bar magnet, valves filched from the echo sounding machine.

Tapped from the wiring which supplied light to the standard compass was the power lead.

Dale switched on the power.

As he did so, he heard Captain Taylor bellowing, "Mr. Whitley, Mr. Whitley! Come down at once! Get under cover, you fool!"

A new noise was heard above the devil's orchestra of high angle fire and bursting bombs, a thin, shrill whining, felt rather than heard. A flickering, violet coruscation ran over the network of wiring, barely visible in the dusk.

At once, Dale knew what was going to happen. His hand hovered over the switch, then fell to his side. He knew that the weapon would disintergrate as it had done before—or would do again? But he knew, this time, what would happen to himself. If, as he feared, he was no more than a mere, hitherto submerged, facet of Whitley's personality, then he would sink into oblivion when the true Whitley was jolted back. If, as he hoped, his future world really existed, then, if he succeeded in tipping the scales and changing the course of history, it would cease to be. No Quentin Dale, no Leonora Starr. And all so that a third-rate scribbler could continue to enjoy the caresses of his meretricious women in half the seaports of the world.

Dale smiled, a bitter, twisted smile.

"NO," he told himself, "there's more at stake than that!"

Meanwhile, on the bridge, things were going far from well. Captain Taylor had ceased bellowing for his Second Officer as he had far more important matters to engage his attention. For, on the monkey island, powerful magnetic forces had come into play. A blue pole of such intensity as to affect the compass needles of ships two miles away was dragging at the north seeking ends of the compass needles of those same ships. The entire front line of the convoy was converging upon the unfortunate Captain Taylor.

Telegraphs rang frantically, and he pulled clear ahead with a split second to spare. Astern, the Commodore and the next abeam to port collided.

A silence had fallen over the ships, a silence broken only by the ever diminishing roar of the Luftwaffe bombers. Fire Control Officers and gunners alike gazed at the heavens with a wild surmise, watching the fast, silent doom that was overtaking each attacking plane.

"You were wrong!" shouted Dale

from the monkey island. "You were wrong, Don John! This is where Quentin Dale changes history!"

And the sense of unbearable strain became ever more acute, and the shrill whining rose in pitch and volume till it seemed that neither human minds nor ears could endure it. The very air seemed to quiver, until it seemed to those standing on the bridge that they were peering through water at the vague, unstable outlines of long sunken ships, and that the great black shapes of the bombers were some kind of monstrous devil fish.

By this time, the attackers had learned that some new weapon had been brought into play. The first plane, and the second, and the third, had dissolved into a puff of impalpable dust. Those following had taken evasive action, only to be hunted down, one by one, by that invisible lethal beam evidently projected from one of the ships of the convoy.

Finally, of all that air armada, but one plane remained. He twisted and turned, he looped and dived, but he would not return to his base. The pilot was either very brave or very stupid. It would seem that his duty was to report to his superiors on land a first-hand account of the new weapon, but—he was determined to press home the attack.

Dale could have sworn that he clipped a wing tip, was willing to stake his bottom dollar that he had shorn away at least half the Nazi's tail. But the bomber looped and banked, dived and climbed—and refused to return to base.

A sense of nightmare urgency possessed Dale.

He had to wipe the sky clean of Goering's bravos before he returned to his own time—or limbo.

The feeling of strain increased to an unbearable intensity. The dim violet glow along the web of wiring became, incontinently, a blinding radiance. Somewhere, something snapped.

On the bridge, the tragic, little fat man had become one with the tragic, little fat man on his toy stage.

" 'To be, or not to be: that is the question:' " he declaimed.

" 'Whether 'tis nobler in the mind to suffer

" 'The slings and arrows—' "

Then, the great Shakespearean actor-manager realized, suddenly, that the boards he trod were not the boards of a stage.

But Mr. Jenkins was not interested in his Commander's bewilderment. He, using the back of a chart, was sketching rapidly a seascape on which the ships of the convoy sailed in all their beauty.

Helmsman, gunners, sat and stood around in snug, private, happy wish-fulfillment dream worlds.

On monkey island, a dazed and bewildered George Whitley watched a vagrant eddy swirl a handful or so of very fine metallic dust about his feet.

This was Tom Black's big moment.

It is the dream of every Junior Officer to have all his seniors put, harmlessly and painlessly, of course, *hors de combat,* and to be left to run the show in his own way. And, normally, Tom Black was a happy man.

When the A.B. at the wheel was replaced, in a split second, by a perfectly useless barman, the ship became completely out of control. She swung athwart the line of advance of the convoy, lay in the trough of the swell, and constituted a first-class menace to navigation.

Black could see that all his seniors were far from capable of dealing with the situation.

He had no desire to take the wheel himself, for, cooped up in the armored wheelhouse, his field of view would have been restricted.

"Wilde!" he shouted.

Like Black, Wilde's one desire was to excel at his profession.

"Sir?"

"Grab the wheel, quick!"

His mind working with supernormal speed and clarity, the Third Officer could see that he had no hope of pulling clear by putting his helm hard to port. He knew his ship, and she was notoriously sticky on a port turn. He could, of course, have used the engines, but that would mean the loss of steerage way, and the prospect of backing and filling in the middle of that onrushing mob of big, fast ships did not appeal to Black.

"Hard a starboard!" he shouted, at the same time giving the orthodox one short blast on his whistle.

She swung, fast.

"Ease the helm — 'midships — steady!"

End on. Black rushed to meet the convoy.

Black's feat of seamanship would have been easy had the various ships been in their correct stations. But they weren't. The air attack and, later, the confusion caused in the front line by Dale's weapon, had contributed to a state of chaos. All that could be said about the fleet of transports was that they were all going approximately the same way at roughly the same speed.

Whistles blew, telegraphs jangled, and captains cursed as Black swept through the disorganized horde of vessels.

"I'm glad that's over," he said. "Now, I suppose, I'd better get back into station. If they'll have me. Hard-a-starboard, Wilde!"

The drone of an airplane engine caught his ear.

It was the last of the bombers.

Like a vulture, it swooped down upon the lone ship, a ship away from the protection of the umbrella of fire that five hundred itching trigger fingers were waiting to spread over the convoy.

Perhaps the pilot knew that this was the ship on which the weapon had been mounted. Perhaps, having seen the confusion of which this same ship had seemed to be the focus, he assumed that the weapon had blown up and was no longer a menace to him and his kind.

The twelve-pounder opened up, aided and abetted by the after Oerlikons. Both shells and tracer missed astern.

A great pillar of water rose suddenly, not a hundred feet from the bridge. The ship seemed to stagger and swung involuntarily off her course.

The bomber turned, and came in for a second run.

Whitley, who had come down from the monkey island, had enough of his wits about him to realize what was happening. He ran to the port Oerlikon, watched his tracer crawl up to the black shape dimly silhouetted against the first, faint, stars. Too low. He swung his gun. And the gun jammed.

From right behind him came the frenzied chattering of a light machine gun. He saw tracer mount heavenward, reach the vast, black shape, and vanish.

The last of the bombers seemed to stagger in its flight, banked steeply, then fell into an almost vertical dive. Seconds later, it seemed, came the crash of its fall.

Whitley turned his head, to discover the identity of the master marksman.

It was Watkins, the cherubic little cadet.

Negligently, so negligently that Whitley ducked hastily behind the armor of the gun position, he held the still smoking stripped Lewis that he had fired from the creek of his elbow with such deadly effect.

"I fixed dem bums, mister," he piped, in tones of quiet pride and an atrocious Bowery accent. "Dere ain't no guy can throw a pineapple at Wicked Wat, de Wizard Gunman, and live.

"I sure fixed dem bums!"

THE END.

KEY-NOTES TO MYSTERY

When Larry Gray came back from overseas, he expected to spend the rest of his life in peace and quiet. . . . But at Penn Station he met a girl in a taxi — and that was the first skein in a web of intrigue and suspense.

It took Lamont Cranston, alias The Shadow, to straighten things out — to solve the secret held in a phrase of musical notes, to explain the baffling mystery of the FIVE KEYS to CRIME. Read the March issue of

THE SHADOW

AT ALL NEWSSTANDS

Silicone Chemist Report

(Continued from page 5)

are also strikingly useful—because of one particular property. There's a silicone oil of about the consistency of household lubricating oil—a light, low-viscosity liquid. The characteristic of carbon-organics that makes them become more and more viscous as they get colder is so familiar that we tend to think of it as an "of-course" property of liquids. It isn't; water, for instance, is either liquid or solid, but not gooey. Silicone oil is more like water; the viscosity remains the same whether it's setting on a cake of dry ice at nearly 100°F below zero, or cooking in a steam bath of 200°F above zero. It's not a good lubricant, unfortunately—tends to be abrasive, probably due to remaining, almost molecularly-fine particles of silica—but that constant viscosity property makes it the most marvelous answer to a hydraulic-controls engineer's dream ever discovered. It's wonderful. It works the landing gear of a plane just as well when it takes off from a Sahara base at 150° plus as it does when the plane lands in Siberian winter, at 90° minus, and works wing flaps in the stratosphere at —70° nicely too.

And be it remembered that natural rubber is a pure hydrocarbon. Silicone rubber has been made, and is in use. It's far from being perfected yet, but it already surpasses any rubber, natural or synthetic, that's based on carbon chains, in several extremely important respects. It's already got a lot of oxygen atoms in it; it is unaffected by oxygen or ozone, whereas ozone is sure and sudden death to ordinary rubber. Ordinary oxygen, plus ultraviolet light, equals ozone, so air and sunlight is sure, if somewhat slower death to ordinary rubber. Sunlight doesn't faze silicone rubber. Heat and oxygen makes another rubber-killer combination. Silicone rubber is uninterested. Plain heat will cause ordinary vulcanized rubber to polymerize and vulcanize further, going beyond the stage of tough elasticity to the familiar hard-rubber state. That's very useful stuff—provided you want hard rubber. But it's ruinous if you want flexibility, or elasticity. Silicone rubber can be made into tubes that will carry steam under moderate pressure for years without the slightest deterioration; silicone rubber is immune to heat up to 150°C. almost indefinitely. It can stand 200°C. for months. It can be used for long periods as high as 250°C.

So far, the silicone rubber hasn't been investigated very much. It was able to do jobs that nothing else known could accomplish as it was, so it was put into service immediately, before research had more than started on it. It lacks abrasion and tear resistance. When those properties are added, it will make automobile tires that road-heat, oxidation, and sunlight won't touch. Garden hose will not crack due to sunlight, either.

They've made silicone plastics somewhat like bakelite, and from them, enamels and varnishes of wonderful stability. An hour in a test oven toasts the most resistant white carbon-organic enamel an even, burned brown. A hundred hours in the same oven leaves the silicone enamel unaffected. More important, glass fabric tape—silica!—can stand far higher temperatures than any cloth insulating tape can, and would permit motor and generator windings to operate at far higher temperatures—if they just had a varnish to hold the tape in place capable of standing similar heat. Heretofore, the varnish charred, the tape, undamaged itself, peeled off, and *phwooie* for the motor. Silicone varnish, now—

They've needed the stuff too badly to stop and do research before releasing it. And there's still most of the field of silicone chemistry to be investigated—!

The Editor.

Blind Alley

by ISAAC ASIMOV

***Bureaucracy** is a wonderful thing. That divided responsibility, the impossibility of getting anything as subtle as the reactions of an alien race to paternalism through — the thing's hopeless. But it is surprising what an old and adept hand can do with it—*

Illustrated by Kramer

Only once in Galactic History was an intelligent race of non-Humans discovered—

"Essays on History,"
by Ligurn Vier

I.

From: Bureau for the Outer Provinces
To: Loodun Antyok, Chief Public Administrator, A-8

Subject: Civilian Supervisor of Cepheus 18, Administrative Position as,

References:

(a) Act of Council 2515, of the year 971 of the Galactic Empire, entitled, "Appointment of Officials of the Administrative Service, Methods for, Revision of."

(b) Imperial Directive, Ja 2374, dated 243/975 G.E.

1. By authorization of reference (a), you are hereby appointed to the subject position. The authority of said position

as Civilian Supervisor of Cepheus 18 will extend over non-Human subjects of the Emperor living upon the planet under the terms of autonomy set forth in reference (b).

2. The duties of the subject position shall comprise the general supervision of all non-Human internal affairs, co-ordination of authorized government investigating and reporting committees, and the preparation of semiannual reports on all phases of non-Human affairs.

C. Morily, Chief, BuOuProv,
12/977 G.E.

Loodun Antyok had listened carefully and now he shook his round head mildly, "Friend, I'd like to help you, but you've grabbed the wrong dog by the ears. You'd better take this up with the Bureau."

Tomor Zammo flung himself back into his chair, rubbed his beak of a nose fiercely, thought better of whatever he was going to say, and answered quietly, "Logical, but not practical. I can't make a trip to Trantor now. You're the Bureau's representative on Cepheus 18. Are you entirely helpless?"

"Well, even as Civilian Supervisor, I've got to work within the limits of Bureau policy."

"Good," Zammo cried, "then tell me what Bureau policy is. I head a scientific investigating committee, under direct Imperial authorization with, supposedly, the widest powers; yet at every angle in the road I am pulled up short by the civilian authorities with only the parrot shriek of 'Bureau policy' to justify themselves. What *is* Bureau policy? I haven't received a decent definition yet."

Antyok's gaze was level and unruffled. He said, "As I see it—and this is not official, so you can't hold me to it—Bureau policy consists in treating the non-Humans as decently as possible."

"Then what authority have they—"

"*Ssh!* No use raising your voice. As a matter of fact, His Imperial Majesty is a humanitarian and a disciple of the philosophy of Aurelion. I can tell you quietly that it is pretty well-known that it is the Emperor himself who first suggested that this world be established. You can bet that Bureau policy will stick pretty close to Imperial notions. And you can bet that I can't paddle my way against *that* sort of current."

"Well, m'boy," the physiologist's fleshy eyelids quivered, "if you take that sort of attitude, you're going to lose your job. No, I won't have you kicked out. That's not what I mean at all. Your job will just fade out from under you, because nothing is going to be accomplished here!"

"Really? Why?" Antyok was short, pink, and pudgy and his plump-cheeked face usually found it difficult to put on display any expression other than one of bland and cheerful politeness—but it looked grave now.

"You haven't been here long. I have." Zammo scowled. "Mind if I smoke." The cigar in his hand was gnarled and strong and was puffed to life carelessly.

He continued roughly, "There's no place here for humanitarianism, administrator. You're treating non-Humans as if they were Humans and it won't work. In fact, I don't like the word 'non-Human.' They're animals."

"They're intelligent," interjected Antyok, softly.

"Well, intelligent animals, then. I presume the two terms are not mutually exclusive. Alien intelligences mingling in the same space won't work, anyway."

"Do you propose killing them off?"

"Galaxy, no!" He gestured with his cigar. "I propose we look upon them as objects for study, and only that. We could learn a good deal from these animals if we were allowed to. Knowledge, I might point out, that would be used for the immediate benefit of the human race. *There's* humanity for you. *There's* the good of the masses, if it's this spineless cult of Aurelion that interests you."

"What, for instance, do you refer to?"

"To take the most obvious— You have heard of their chemistry, I take it?"

"Yes," Antyok admitted. "I have leafed through most of the reports on the non-Humans published in the last ten years. I expect to go through more."

"Hmp. Well— Then, all I need say is that their chemical therapy is extremely thorough. For instance, I have witnessed personally the healing of a broken bone—what passes for a broken bone with them. I mean—by the use of a pill. The bone was whole in fifteen minutes. Naturally, none of their drugs are any earthly use on Humans. Most would kill quickly. But if we found out how they worked on the non-Humans—on the animals—"

"Yes, yes. I see the significance."

"Oh, you do. Come, that's gratifying. A second point is that these animals communicate in an unknown manner."

"Telepathy!"

The scientist's mouth twisted, as he ground out, "Telepathy! Telepathy! Telepathy! Might as well say by witch brew. Nobody knows anything about telepathy except its name. What is the mechanism of telepathy? What is the physiology and the physics of it? I would like to find out, but I can't. Bureau policy, if I listen to you, forbids."

Antyok's little mouth pursed itself. "But— Pardon me, doctor, but I don't follow you. How are you prevented? Surely the Civil Administration has made no attempt to hamper scientific investigation of these non-Humans. I cannot speak for my predecessor entirely, of course, but I myself—"

"No direct interference has occurred. I don't speak of that. But by the Galaxy, administrator, we're hampered by the spirit of the entire set-up. You're making us deal with humans. You allow them their own leader and internal autonomy. You pamper them and give them what Aurelion's philosophy would call 'rights.' I can't deal with their leader."

"Why not?"

"Because he refuses to allow me a free hand. He refuses to allow experiments on any subject without the subject's own consent. The two or three volunteers we get are not too bright. It's an impossible arrangement."

Antyok shrugged helplessly.

Zammo continued, "In addition, it is obviously impossible to learn anything of value concerning the brains, physiology, and chemistry of these animals without dissection, dietary experiments, and drugs. You know, administrator, scientific investigation is a hard game. Humanity hasn't much place in it."

Loodun Antyok tapped his chin with a doubtful finger, "Must it be quite so hard? These are harmless creatures, these non-Humans. Surely, dissection— Perhaps, if you were to approach them a bit differently— I have the idea that you antagonize them. Your attitude might be somewhat overbearing."

"Overbearing! I am not one of these whining social psychologists who are all the fad these days. I don't believe you can solve a problem that requires dissection by approaching it with what is called the 'correct personal attitude' in the cant of the times."

"I'm sorry you think so. Sociopsychological training is required of all administrators above the grade of A-4."

Zammo withdrew his cud of a cigar from his mouth and replaced it after a suitably contemptuous interval, "Then you'd better use a bit of your technique on the Bureau. You know, I *do* have friends at the Imperial court."

"Well, now, I *can't* take the matter up with them, not baldly. Basic policy does not fall within my cognizance and such things can only be initiated by the Bureau. But, you know, we might try an indirect approach on this." He smiled faintly, "Strategy."

"What sort?"

Antyok pointed a sudden finger, while his other hand fell lightly on the rows of gray-bound reports upon the floor just next his chair. "Now, look, I've gone through most of these. They're dull, but contain *some* facts. For instance, when was the last non-Human infant born on Cepheus 18?"

Zammo spent little time in consideration, "Don't know. Don't care, either."

"But the Bureau would. There's *never* been a non-Human infant born on Cepheus 18—not in the two years the world has been established. Do you know the reason?"

The physiologist shrugged, "Too many possible factors. It would take study."

"All right, then. Suppose you write a report—"

"Reports! I've written twenty."

"Write another. Stress the unsolved problems. Tell them you must change your methods. Harp on the birth-rate problem. The Bureau doesn't dare ignore that. If the non-Humans die out, someone will have to answer to the Emperor. You see—"

Zammo stared, his eyes dark, "That will swing it?"

"I've been working for the Bureau for twenty-seven years. I know its ways."

"I'll think about it." Zammo rose and stalked out of the office. The door slammed behind him.

It was later that Zammo said to a co-worker, "He's a bureaucrat in the first place. He won't abandon the orthodoxies of paper work and he won't risk sticking his neck out. He'll accomplish little by himself, yet maybe more than a little, if we work through him."

From: Administrative Headquarters, Cepheus 18

To: BuOuProv

Subject: Outer Province Project 2563, Part II—Scientific Investigations of non-Humans of Cepheus 18, Co-ordination of.

References:

(a) BuOuProv letr. Cep-N-CM/jg, 100132, dated 302/975 G.E.

(b) AdHQ-Ceph18 letr. AA-LA/mn, dated 140/977 G.E.

Enclosure:

1. SciGroup 10, Physical & Biochemical Division, Report, entitled, "Physiologic Characteristics of non-Humans of Cepheus 18, Part XI," dated 172/977 G.E.

1. Enclosure 1, included herewith, is forwarded for the information of the BuOuProv. It is to be noted that Section XII, paragraphs 1-16 of Encl. 1, concern possible changes in present BuOuProv policy with regard to non-Humans with a view to facilitating physical and chemical investigations at present proceeding under authorization of reference (a)

2. It is brought to the attention of the BuOuProv that reference (b) has already discussed possible changes in investigating methods, and that it remains the opinion of AdHQ-Ceph18 that such changes are as yet premature. It is nevertheless suggested that the question of non-Human birth rate be made the subject of a BuOuProv project assigned to AdHQ-Ceph18, in view of the importance attached by SciGroup 10 to the problem, as evidenced in Section V of Enclosure 1.

L. Antyok, Superv. AdHQ-Ceph18, 174/977

From: BuOuProv

To: AdHQ-Ceph18

Subject: Outer Province Project 2563—Scientific Investigations of non-Humans of Cepheus 18, Co-ordination of.

Reference:

(a) AdHQ-Ceph18 letr. AA-LA/mn, dated 174/977 G.E.

1. In response to the suggestion contained in paragraph 2 of reference (a), it is considered that the question of the non-Human birth rate does not fall within the cognizance of AdHQ-Ceph18. In view of the fact that SciGroup 10 has reported said sterility to be probably due to a chemical deficiency in the food supply, all investigations in the field are relegated to SciGroup 10 as the proper authority.

2. Investigating procedures by the various SciGroups shall continue according to current directives on the subject. No changes in policy are envisaged.

C. Morily, Chief, BuOuProv, 186/977 G.E.

II.

There was a loose-jointed gauntness about the news reporter which made him appear somberly tall. He was Gustiv Bannerd, with whose reputation was combined ability—two things which do not invariably go together despite the maxims of elementary morality.

Loodun Antyok took his measure doubtfully and said, "There's no use denying that you're right. But the SciGroup report was confidential. I don't understand how—"

"It leaked," said Bannerd, callously. "Everything leaks."

Antyok was obviously baffled, and

his pink face furrowed slightly, "Then I'll just have to plug the leak here. I can't pass your story. All reference to SciGroup complaints have to come out. You see that, don't you?"

"No." Bannerd was calm enough. "It's important; and I have my rights under the Imperial directive. I think the Empire should know what's going on."

"But it isn't going on," said Antyok, despairingly. "Your claims are all wrong. The Bureau isn't going to change its policy. I showed you the letters."

"You think you can stand up against Zammo when he puts the pressure on?" the newsman asked derisively.

"I will—if I think he's wrong."

"If!" stated Bannerd flatly. Then, in a sudden fervor, "Antyok, the Empire has something great here; something greater by a good deal than the government apparently realizes. They're destroying it. They're treating these creatures like animals."

"Really—" began Antyok, weakly.

"Don't talk about Cepheus 18. It's a zoo. It's a high-class zoo, with your petrified scientists teasing those poor creatures with their sticks poking through the bars. You throw them chunks of meat, but you cage them up. I know! I've been writing about them for two years now. I've almost been living with them."

"Zammo says—"

"Zammo!" This with hard contempt.

"Zammo says," insisted Antyok with worried firmness, "that we treat them too like humans as it is."

The newsman's straight long cheeks were rigid, "Zammo is rather animallike in his own right. He is a science-worshiper. We can do with less of them. Have you read Aurelion's works?" The last was suddenly posed.

"Umm. Yes. I understand the Emperor—"

"The Emperor tends towards us. That is good—better than the hounding of the last reign."

"I don't see where you're heading?"

"These aliens have much to teach us. You understand? It is nothing that Zammo and his SciGroup can use; no chemistry, no telepathy. It's a way of life; a way of thinking. The aliens have no crime, no misfits. What effort is being made to study their philosophy? Or to set them up as a problem in social engineering?"

Antyok grew thoughtful and his plump face smoothed out, "It is an interesting consideration. It would be a matter for psychologists—"

"No good. Most of them are quacks. Psychologists point out problems but their solutions are fallacious. We need men of Aurelion. Men of The Philosophy—"

"But look here, we can't turn Cepheus 18 into . . . into a metaphysical study."

"Why not? It can be done easily."

"How?"

"Forget your puny test-tube

peerings. Allow the aliens to set up a society free of Humans. Give them an untrammeled independence and allow an intermingling of philosophies—"

Antyok's nervous response came, "That can't be done in a day."

"We can start in a day."

The administrator said slowly, "Well, I can't prevent you from trying to start." He grew confidential, his mild eyes thoughtful, "You'll ruin your own game, though, if you publish SciGroup 10's report and denounce it on humanitarian grounds. The Scientists are powerful."

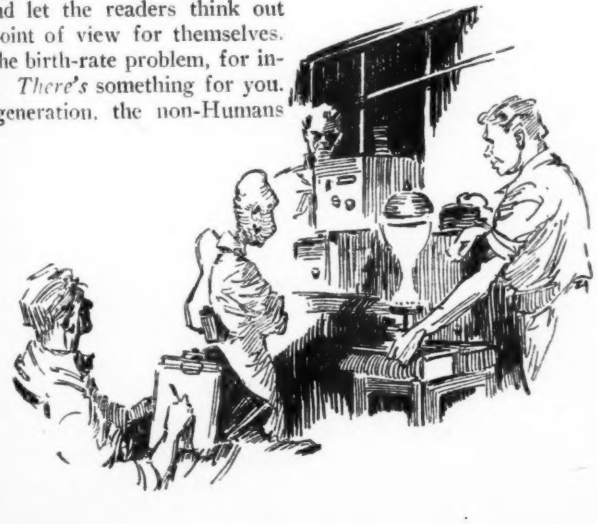
"And we of The Philosophy as well."

"Yes, but there's an easy way. You needn't rave. Simply point out that the SciGroup is not solving its problems. Do so unemotionally and let the readers think out your point of view for themselves. Take the birth-rate problem, for instance. *There's* something for you. In a generation, the non-Humans might die out for all science can do. Point out that a more philosophical approach is required. Or pick some other obvious point. Use your judgment, eh?"

Antyok smiled ingratiatingly as he arose, "But for the Galaxy's sake, don't stir up a bad smell."

Bannerd was stiff and unresponsive, "You may be right."

It was later that Bannerd wrote in a capsule message to a friend, "He is not clever, by any means. He is confused and has no guiding-line through life. Certainly utterly incompetent in his job. But he's a cutter and a trimmer, compromises his way around difficulties, and will yield concessions rather than risk a hard stand. He may prove valuable in that. Yours in Aurelion."



From: AdHQ-Ceph18
To: BuOuProv
Subject: Birth rate of non-Humans on Cepheus 18, News Report on.
References:
(a) AdHQ-Ceph18 letr. AA-LA/mn, dated 174/977 G.E.
(b) Imperial Directive, Ja2374, dated 243/975 G.E.
Enclosures:
1-G. Bannerd news report, datelined Cepheus 18, 201/977 G.E.
2-G. Bannerd news report, datelined Cepheus 18, 203/977 G.E.

1. The sterility of non-Humans on Cepheus 18, reported to the BuOuProv in reference (a) has become the subject of news reports to the galactic press. The news reports in question are submitted herewith for the information of the BuOuProv as Enclosures 1 and 2. Although said reports are based on material considered confidential and closed to the public, the news reporter in question maintained his rights to free expression under the terms of reference (b).

2. In view of the unavoidable publicity and misunderstanding on the part of the general public now inevitable, it is requested that the BuOuProv direct future policy on the problem of non-Human sterility.

L. Antyok, Superv. AdHQ-Ceph18, 209/977 G.E.

From: BuOuProv
To: AdHQ-Ceph18
Subject: Birth rate of non-Humans on Cepheus 18, Investigation of.
References:
(a) AdHQ-Ceph18 letr. AA-LA/mn, dated 209/977 G.E.
(b) AdHQ-Ceph18 letr. AA-LA/mn, dated 174/977 G.E.

1. It is proposed to investigate the causes and the means of precluding the unfavorable birth-rate phenomena memtioned in references (a) and (b) A project is therefore set up, entitled, "Birth rate of non-Humans on Cepheus 18, Investigation of" to which, in view of the crucial importance of the subject, a priority of AA is given.

2. The number assigned to the subject project is 2910, and all expenses incidental to it shall be assigned to Appropriation number 18/78.

C. Morily, Chief, BuOuProv, 223/977 G.E.

III.

If Tomor Zammo's ill-humor lessened within the grounds of Sci-Group 10 Experimental Station, his friendliness had not thereby increased. Antyok found himself standing alone at the viewing window into the main field laboratory.

The main field laboratory was a broad court set at the environmental conditions of Cepheus 18 itself for the discomfort of the experimenters and the convenience of the experimentees. Through the burning sand, and the dry, oxygen-rich air, there sparkled the hard brilliance of hot, white sunlight. And under the blaze, the brick-red non-Humans, wrinkled of skin and wiry of build, huddled in their squatting positions of ease, by ones and twos.

Zammo emerged from the laboratory. He paused to drink water thirstily. He looked up, moisture gleaming on his upper lip, "Like to step in there."

Antyok shook his head definitely, "No, thank you. What's the temperature right now?"

"A hundred twenty, if there were shade. And they complain of the cold. It's drinking time now. Want to watch them drink?"

A spray of water shot upward from the fountain in the center of the court and the little alien figures swayed to their feet and hopped eagerly forward in a queer springy half-run. They milled about the water, jostling one another. The centers of their faces were suddenly disfigured by the projection of a long and flexible fleshy tube, which thrust forward into the spray and was withdrawn dripping.

It continued for long minutes. The bodies swelled and the wrinkles disappeared. They retreated slowly, backing away, with the drinking tube flicking in and out, before receding finally into a pink, wrinkled mass above a wide, lipless mouth. They went to sleep in groups in the shaded angles, plump and sated.

"Animals!" said Zammo, with contempt.

"How often do they drink?" asked Antyok.

"As often as they want. They can go a week if they have to. We water them every day. They store it under their skin. They eat in the evenings. Vegetarians, you know."

Antyok smiled chubbily. "It's nice to get a bit of firsthand information occasionally. Can't read reports all the time."

"Yes?"—noncommittally. Then, "What's new? What about the lacy-pants boys on Trantor?"

Antyok shrugged dubiously. "You can't get the Bureau to commit itself, unfortunately. With the Emperor sympathetic to the Aurelionists, humanitarianism is the order of the day. You know that."

There was a pause in which the administrator chewed his lip uncertainly. "But there's this birth-rate problem now. It's finally been assigned to AdHQ, you know—and double A priority, too."

Zammo muttered wordlessly.

Antyok said, "You may not realize it, but that project will now take precedence over all other work proceeding on Cepheus 18. It's important."

He turned back to the viewing window and said thoughtfully, with a bald lack of preamble, "Do you think those creatures might be unhappy?"

"Unhappy!" The word was an explosion.

"Well, then," Antyok corrected hastily, "maladjusted. You understand? It's difficult to adjust an environment to a race we know so little of."

"Say—did you ever see the world we took them from?"

"I've read the reports—"

"Reports!"—infinite contempt. "I've *seen* it. This may look like desert out there to you, but it's a watery paradise to those devils. They have all the food and water they can get. They have a world to themselves with vegetation and natural water flow, instead of a lump of silica and granite where fungi were force-grown in caves and water had to be steamed out of gypsum rock. In ten years, they would have been dead to the last beast, and we saved them. Unhappy? Ga-a-ah, if they are, they haven't the decency of most animals."

"Well, perhaps. Yet I have a notion."

"A notion? What is your notion?" Zammo reached for one of his cigars.

"It's something that might help you. Why not study the creatures in a more integrated fashion? Let them use their initiative. After all, they did have a highly-developed science. Your reports speak of it continually. Give them problems to solve."

"Such as?"

"Oh . . . oh," Antyok waved his hands helplessly. "Whatever you think might help most. For instance, spaceships. Get them into the control room and study their reactions."

"Why?" asked Zammo with dry bluntness.

"Because the reaction of their minds to tools and controls adjusted to the human temperament can teach you a lot. In addition, it will make a more effective bribe, it seems to me, than anything you've yet tried. You'll get more volunteers if they think they'll be doing something interesting."

"That's your psychology coming out. Hm-m-m. Sounds better than it probably is. I'll sleep on it. And where would I get permission in any case to let them handle spaceships. I've none at *my* disposal, and it would take a good deal longer than it was worth to follow down the line of red tape to get one assigned to us."

Antyok pondered and his forehead creased lightly, "It doesn't *have* to be spaceships. But even so — If you would write up another report and make the suggestion yourself—strongly, you understand—I might figure out some way of tying it up with my birth-rate project. A double-A priority can get practically anything, you know, without questions."

Zammo's interest lacked a bit even of mildness, "Well, maybe. Meanwhile, I've some basal metabolism tests in progress, and it's getting late. I'll think about it. It's got its points."

From: AdHQ-Ceph18
To: BuOuProv
Subject: Outer Province Project 2910, Part I—Birth rate of non-Humans on Cepheus 18, Investigation of.
Reference:
(a) BuOuProv letr. Ceph-N-CM/car, 115097, 223/977 G.E.
Enclosure:
1-SciGroup 10, Physical & Biochemical Division report, Part XV, dated 220/977 G.E.

1. Enclosure 1 is forwarded herewith for the information of the BuOuProv.

2. Special attention is directed to Section V, Paragraph 3 of Enclosure 1 in which it is requested that a spaceship be assigned SciGroup 10 for use in expediting investigations authorized by the BuOuProv. It is considered by AdHQ-Ceph18 that such investigations may be of material use in aiding work now in progress on the subject project, authorized by reference (a). It is suggested, in view of the high priority placed by the BuOuProv upon the subject project, that immediate consideration be given the SciGroup's request.

L. Antyok, Superv. AdHQ-Ceph18,
240/977 G.E.

From: BuOuProv
To: AdHQ-Ceph18
Subject: Outer Province Project 2910—Birth rate of non-Humans on Cepheus 18, Investigation of.
Reference:
(a) AdHQ-Ceph18 letr. AA-LA/mn, dated 240/977 G.E.

1. Training Ship *AN-R-2055* is being placed at the disposal of AdHQ-Ceph18 for use in investigation of non-Humans on Cepheus 18 with respect to the subject project and other authorized OuProv projects as requested in Enclosure 1 to reference (a).

2. It is urgently requested that work on the subject project be expedited by all available means.

C. Morily, Head, BuOuProv,
251/977 G.E.

IV.

The little bricky creature must have been more uncomfortable than his bearing would admit to. He was carefully wrapped in a temperature already adjusted to the point where his human companions steamed in their open shirts.

His speech was high-pitched and careful, "I find it damp, but not unbearably so at this low temperature."

Antyok smiled, "It was nice of you to come. I had planned to visit you, but a trial run in your atmosphere out there—" The smile had become rueful.

"It doesn't matter. You otherworldlings have done more for us than ever we were able to do for ourselves. It is an obligation that is but imperfectly returned by the endurance on my part of a trifling discomfort." His speech seemed always indirect, as if he approached his thoughts sidelong, or as if it were against all etiquette to be blunt.

Gustiv Bannerd, seated in an angle of the room, with one long leg crossing the other, scrawled nimbly and said, "You don't mind if I record all this?"

The Cepheid non-Human glanced briefly at the journalist, "I have no objection."

Antyok's apologetics persisted. "This is not a purely social affair, sir. I would not have forced discomfort on you for that. There are important questions to be considered, and you are the leader of your people."

The Cepheid nodded, "I am satisfied your purposes are kindly. Please proceed."

The administrator almost wriggled in his difficulty in putting thoughts into words. "It is a subject," he said, "of delicacy, and one I would never bring up if it weren't for the overwhelming importance of the . . . uh . . . question. I am only the spokesman of my government—"

"My people consider the otherworld government a kindly one."

"Well, yes, they are kindly. For that reason, they are disturbed over the fact that your people no longer breed."

Antyok paused, and waited with worry for a reaction that did not come. The Cepheid's face was motionless except for the soft, trembling motion of the wrinkled area that was his deflated drinking tube.

Antyok continued, "It is a question we have hesitated to bring up because of its extremely personal angles. Noninterference is my government's prime aim, and we have done our best to investigate the problem quietly and without disturbing your people. But, frankly, we—"

"Have failed?" finished the

Cepheid, at the other's pause.

"Yes. Or at least, we have not discovered a concrete failure to reproduce the exact environment of your original world; with, of course, the necessary modification to make it more livable. Naturally, it is thought there is some chemical shortcoming. And so I ask your voluntary help in the matter. Your people are advanced in the study of your own biochemistry. If you do not choose, or would rather not—"

"No, no, I can help." The Cepheid seemed cheerful about it. The smooth flat planes of his loose-skinned, hairless skull wrinkled in an alien response to an uncertain emotion. "It is not a matter that any of us would have thought would have disturbed you other-worldlings. That it does is but another indication of your well-meaning kindness. This world we find congenial, a paradise in comparison to our old. It lacks in nothing. Conditions such as now prevail belong in our legends of the Golden Age."

"Well—"

"But there is a something; a something you may not understand. We cannot expect different intelligences to think alike."

"I shall try to understand."

The Cepheid's voice had grown soft, its liquid undertones more pronounced, "We were dying on our native world; but we were fighting. Our science, developed through a history older than yours, was losing; but it had not yet lost. Perhaps it was because our science was fundamentally biological, rather than physical as yours is. Your people discovered new forms of energy and reached the stars. Our people discovered new truths of psychology and psychiatry and built up a working society free of disease and crime.

"There is no need to question which of the two angles of approach was the more laudable, but there is no uncertainty as to which proved more successful in the end. In our dying world, without the means of life or sources of power, our biological science could but make the dying easier.

"And yet we fought. For centuries past we had been groping toward the elements of atomic power, and slowly the spark of hope had glimmered that we might break through the two-dimensional limits of our planetary surface and reach the stars. There were no other planets in our system to serve as stepping stones. Nothing but some twenty light-years to the nearest star, without the knowledge of the possibility of the existence of other planetary systems, but rather with the supposed near-certainty of the contrary.

"But there is something in all life that insists on striving; even on useless striving. There were only five thousand of us left in the last days. Only five thousand. And our first ship was ready. It was experimental. It would probably have been a failure. But already we had all the principles of propulsion and navigation correctly worked out."

There was a long pause, and the Cepheid's small black eyes seemed glazed in retrospect.

The newspaperman put in suddenly, from his corner, "And then we came?"

"And then you came," the Cepheid agreed simply. "It changed everything. Energy was ours for the asking. A new world, congenial and, indeed, ideal, was ours even without asking. If our problems of society had long been solved by ourselves, our more difficult problems of environment were suddenly solved for us, no less completely."

"Well?" urged Antyok.

"Well—it was somehow not well. For centuries our ancestors had fought towards the stars, and now the stars suddenly proved to be the property of others. We had fought for life, and it had become a present handed to us by others. There is no longer any reason to fight. There is no longer anything to attain. All the universe is the property of your race."

"This world is yours," said Antyok, gently.

"By sufferance. It is a gift. It is not ours by right."

"You have earned it, in my opinion."

And now the Cepheid's eyes were sharply fixed on the other's countenance, "You mean well, but I doubt that you understand. We have nowhere to go, save this gift of a world. We are in a blind alley. The function of life is striving, and that is taken from us. Life can no longer interest us. We have no offspring—voluntarily. It is our way

HE GOT THE PURPLE HEART. . .

WILL A BOND PROVE TOO COSTLY FOR YOU?

It's left to your own conscience, because that's the kind of country we are. Somewhere else in the world, the money needed to carry on the war would be gotten through added taxes, compulsory savings. But not here. Because we're still free . . . and it's still up to you—and no one else—to decide whether or not your country, or your boy, is worth another bond.

BUY IT NOW!
THE WORLD'S
BEST INVESTMENT!

WAR BONDS

of removing ourselves from your way."

Absent-mindedly, Antyok had removed the fluoro-globe from the window seat, and spun it on its base. Its gaudy surface reflected light as it spun and its three-foot-high bulk floated with incongruous grace and lightness in the air.

Antyok said, "Is that your only solution? Sterility?"

"We might escape still," whispered the Cepheid, "but where in the Galaxy is there place for us? It is all yours."

"Yes, there is no place for you nearer than the Magellanic Clouds if you wished independence. The Magellanic Clouds—"

"And you would not let us go of yourselves. You mean kindly, I know."

"Yes, we mean kindly—but we could not let you go."

"It is a mistaken kindness."

"Perhaps, but could you not reconcile yourselves? You have a world."

"It is something past complete explanations. Your mind is different. We could not reconcile ourselves. I believe, administrator, that you have thought of all this before. The concept of the blind alley we find ourselves trapped in is not new to you."

Antyok looked up, startled, and one hand steadied the fluoroglobe, "Can you read my mind?"

"It is just a guess. A good one, I think."

"Yes—but *can* you read my mind? The minds of humans in general, I mean. It is an interesting point. The scientists say you cannot, but sometimes I wonder if it is that you simply will not. Could you answer that? I am detaining you, unduly, perhaps."

"No . . . no—" But the little Cepheid drew his enveloping robe closer, and buried his face in the electrically-heated pad at the collar for a moment. "You other-worldlings speak of reading minds. It is not so at all, but it is assuredly hopeless to explain."

Antyok mumbled the old proverb, "One cannot explain sight to a man blind from birth."

"Yes, just so. This sense which you call 'mind reading,' quite erroneously, cannot be applied to other-worldlings. It is not that we cannot receive the proper sensations, it is that your people do not transmit them, and we have no way of explaining to you how to go about it."

"Hm-m-m."

"There are times, of course, of great concentration or emotional tension on the part of an other-worldling when some of us who are more expert in this sense; more sharp-eyed, so to speak; detect vaguely *something*. It is uncertain; yet I myself have at times wondered—"

Carefully, Antyok began spinning the fluoro-globe once more. His pink face was set in thought, and his eyes were fixed upon the Cepheid. Gustiv Bannerd stretched his fingers and reread his notes, his lips moving silently.

The fluoro-globe spun, and slowly the Cepheid seemed to grow tense as well, as his eyes shifted to the colorful sheen of the globe's fragile surface.

The Cepheid said, "What is that?"

Antyok started, and his face smoothed into an almost chuckling placidity, "This? A Galactic fad of three years ago; which means that it is a hopelessly old-fashioned relic this year. It is a useless device but it looks pretty. Bannerd, could you adjust the windows to nontransmission?"

There was the soft click of a contact, and the windows became curved regions of darkness, while in the center of the room, the fluoro-globe was suddenly the focus of a rosy effulgence that seemed to leap outward in streamers. Antyok, a scarlet figure in a scarlet room, placed it upon the table and spun it with a hand that dripped red. As it spun, the colors changed with a slowly increasing rapidity, blended and fell apart into more extreme contrasts.

Antyok was speaking in an eerie atmosphere of molten, shifting rainbow, "The surface is of a material that exhibits variable fluorescence. It is almost weightless, extremely fragile, but gyroscopically balanced so that it rarely falls with ordinary care. It is rather pretty, don't you think?"

From somewhere the Cepheid's voice came, "Extremely pretty."

"But it has outworn its welcome: outlived its fashionable existence."

The Cepheid's voice was abstracted, "It is very pretty."

Bannerd restored the light at a gesture, and the colors faded.

The Cepheid said, "That is something my people would enjoy." He stared at the globe with fascination.

And now Antyok rose, "You had better go. If you stay longer, the atmosphere may have bad effects. I thank you humbly for your kindness."

"I thank you humbly for yours." The Cepheid had also risen.

Antyok said, "Most of your people, by the way, have accepted our offers to them to study the make-up of our modern spaceships. You understand, I suppose, that the purpose was to study the reactions of your people to our technology. I trust that conforms with your sense of propriety."

"You need not apologize. I, myself, have now the makings of a human pilot. It was most interesting. It recalls our own efforts—and reminds us of how nearly on the right track we were."

The Cepheid left, and Antyok sat, frowning.

"Well," he said to Bannerd, a little sharply. "You remember our agreement, I hope. This interview can't be published."

Bannerd shrugged, "Very well."

Antyok was at his seat, and his fingers fumbled with the small metal figurine upon his desk, "What do you think of all this, Bannerd?"

"I am sorry for them. I think I understand how they feel. We must educate them out of it. The Philosophy can do it."

"You think so?"

"Yes."

"We can't let them go, of course."

"Oh, no. Out of the question. We have too much to learn from them. This feeling of theirs is only a passing stage. They'll think differently, especially when we allow them the completest independence."

"Maybe. What do you think of the fluoro-globes, Bannerd? He liked them. It might be a gesture of the right sort to order several thousand of them. The Galaxy knows they're a drug on the market right now, and cheap enough."

"Sounds like a good idea," said Bannerd.

"The Bureau would never agree, though. I know them."

The newsman's eyes narrowed, "But it might be just the thing. They need new interests."

"Yes? Well, we *could* do something. I could include your transcript of the interview as part of a report and just emphasize the matter of the globes a bit. After all, you're a member of The Philosophy and might have influence with important people, whose word with the Bureau might carry much more weight than mine. You understand—?"

"Yes," mused Bannerd. "Yes."

From: AdHQ-Ceph18
To: BuOuProv
Subject: OuProv Project 2910, Part II; Birth rate of non-Humans on Cepheus 18, Investigation of.
Referene:
(a) BuOuProv letr. Cep-N-CM/car, 115097, dated 223/977 G.E.
Enclosure:
1. Transcript of conversation between L. Antyok of AdHQ-Ceph18, and Ni-San, High Judge of the non-Humans on Cepheus 18.

1. Enclosure 1 is forwarded herewith for the information of the BuOuProv.

2. The investigation of the subject project undertaken in response to the authorization of reference (a) is being pursued along the new lines indicated in Enclosure 1. The BuOuProv is assured that every means will be used to combat the harmful psychological attitude at present prevalent among the non-Humans.

3. It is to be noted that the High Judge of the non-Humans on Cepheus 18 expressed interest in fluoro-globes. A preliminary investigation into this fact of non-Human psychology has been initiated.

L. Antyok, Superv. AdHQ-
Ceph18, 272/977 G.E.

From: BuOuProv
To: AdHQ-Ceph18
Subject: OuProv Project 2910; Birth rate of non-Humans on Cepheus 18, Investigation of.
Reference:
(a) AdHQ-Ceph18 letr. AA-LA/mn, dated 272/977 G.E.

1. With reference to Enclosure 1 of

reference (a), five thousand fluoro-globes have been allocated for shipment to Cepheus 18, by the Department of Trade.

2. It is instructed that AdH-Ceph18 make use of all methods of appeasing non-Humans dissatisfaction consistent with the necessities of obedience to Imperial proclamations.

C. Morily, Chief, BuOuProv,
283/977 G.E.

V.

The dinner was over, the wine had been brought in, and the cigars were out. The groups of talkers had formed and the captain of the merchant fleet was the center of the largest. His brilliant white uniform quite outsparkled his listeners.

He was almost complacent in his speech: "The trip was nothing. I've had more than three hundred ships under me before this. Still, I've never had a cargo quite like this. What do you want with five thousand fluoro-globes on this desert, by the Galaxy."

Loodun Antyok laughed gently. He shrugged, "For the non-Humans. It wasn't a difficult cargo, I hope."

"No, not difficult. But bulky. They're fragile, and I couldn't carry more than twenty to a ship with all the government regulations concerning packing and precautions against breakage. But it's the government's money, I suppose."

Zammo smiled grimly, "Is this your first experience with government methods, captain?"

"Galaxy, no," exploded the spaceman. "I try to avoid it, of course, but you can't help getting entangled on occasion. And it's an abhorrent thing when you are, and that's the truth. The red tape! The paper work! It's enough to stunt your growth and curdle your circulation. It's a tumor, a cancerous growth on the Galaxy. I'd wipe out the whole mess."

Antyok said, "You're unfair, captain. You don't understand."

"Yes? Well, now, as one of these bureaucrats," and he smiled amiably at the word, "suppose you explain your side of the situation, administrator."

"Well, now," Antyok seemed confused, "government is a serious and complicated business. We've got thousands of planets to worry about in this Empire of ours and billions of people. It's almost past human ability to supervise the business of governing without the tightest sort of organization. I think there are something like four hundred million men today in the Imperial Administrative Service alone and in order to co-ordinate their efforts and to pool their knowledge, you *must* have what you call red tape and paper work. Every bit of it, senseless though it may seem, annoying though it may be, has its uses. Every piece of paper is a thread binding the labors of four hundred million humans. Abolish the Administrative Service and you abolish the Empire; and with it, interstellar peace, order, and civilization."

"Come—" said the captain.

"No. I mean it." Antyok was earnestly breathless. "The rules and system of the Administrative set-up must be sufficiently all-embracing and rigid, so that in case of incompetent officials, and sometimes one *is* appointed . . . you may laugh, but there are incompetent scientists, and newsmen, and captains, too . . . in case of incompetent officials, I say, little harm will be done. For at the worst, the system can move by itself."

"Yes," grunted the captain, sourly, "and if a capable administrator should be appointed? He is then caught by the same rigid web and is forced into mediocrity."

"Not at all," replied Antyok, warmly. "A capable man can work within the limits of the rules and accomplish what he wishes."

"How?" asked Bannerd.

"Well . . . well—" Antyok was suddenly ill at ease. "One method is to get yourself an A-priority project, or double-A, if possible."

The captain leaned his head back for laughter, but never quite made it, for the door was flung open and frightened men were pouring in. The shouts made no sense at first. Then:

"Sir, the ships are gone. These non-Humans have taken them by force."

"What? All?"

"Every one. Ships and creatures—"

It was two hours later that the four were together again, alone in Antyok's office now.

Antyok said coldly, "They've made no mistakes. There's not a ship left behind, not even your training ship, Zammo. And there isn't a government ship available in this entire half of the Sector. By the time we organize a pursuit, they'll be out of the Galaxy and halfway to the Magellanic Clouds. Captain, it was your responsibility to maintain an adequate guard."

The captain cried, "It was our first day out of space. Who could have known—"

Zammo interrupted fiercely, "Wait a while, captain. I'm beginning to understand. Antyok," his voice was hard, "you engineered this."

"I?" Antyok's expression was strangely cool, almost indifferent.

"You told us this evening that a clever administrator got an A-priority project assigned to accomplish what he wished. You got such a project in order to help the non-Humans escape."

"I did? I beg your pardon, but how could that be? It was you yourself in one of your reports that brought up the problem of the failing birth rate. It was Bannerd, here, whose sensational articles frightened the Bureau into making a double A-priority project out of it. I had nothing to do with it."

"*You* suggested that I mention the birth rate," said Zammo, violently.

"Did I?" said Antyok, composedly.

"And for that matter," roared Bannerd, suddenly, "you suggested that I mention the birth rate in my articles."

The three ringed him now and hemmed him in. Antyok leaned back in his chair and said easily, "I don't know what you mean by suggestions. If you are accusing me, please stick to evidence—legal evidence. The laws of the Empire go by written, filmed, or transcribed material, or by witnessed statements. All my letters as administrator are on file here, at the Bureau, and at other places. I never asked for an A-priority project. The Bureau assigned it to me, and Zammo and Bannerd are responsible for that. In print, at any rate."

Zammo's voice was an almost inarticulate growl, "You hoodwinked me into teaching the creatures how to handle a spaceship."

"It was *your* suggestion. I have your report proposing they be studied in their reaction to human tools on file. So has the Bureau. The evidence—the *legal* evidence, is plain. I had nothing to do with it."

"Nor with the globes?" demanded Bannerd.

The captain howled suddenly, "You had my ships brought here purposely. Five thousand globes! You knew it would require hundreds of craft."

"I never asked for globes," said Antyok, coldly. "That was the Bureau's idea, although I think Bannerd's friends of The Philosophy helped that along."

Bannerd fairly choked. He spat out, "You were asking that Cepheid leader if he could read minds. You were telling him to express interest in the globes."

"Come now. You prepared the transcript of the conversation yourself, and that, too, is on file. You can't prove it." He stood up. "You'll have to excuse me. I must prepare a report for the Bureau."

At the door, Antyok turned, "In a way, the problem of the non-Humans is solved, even if only to their own satisfaction. They'll breed now, and have a world they've earned themselves. It's what they wanted.

"Another thing. Don't accuse me of silly things. I've been in the Service for twenty-seven years, and I assure you that my paper work is proof enough that I have been thoroughly correct in everything I have done. And captain, I'll be glad to continue our discussion of earlier this evening at your convenience and explain how a capable administrator can work through red tape and still get what he wants."

It was remarkable that such a round, smooth baby-face could wear a smile quite so sardonic.

From: BuOuProv
To: Loodun Antyok, Chief Public Administrator, A-8
Subject: Administrative Service. Standing in.
Reference:
(a) AdServ Court Decision 22874-Q, dated 1/978 G.E.

1. In view of the favorable opinion handed down in reference (a) you are hereby absolved of all responsibility for the flight of non-Humans on Cepheus 18. It is requested that you hold yourself in readiness for your next appointment.

R. Horpritt, Chief, AdServ,
15/978 G.E.

THE END.

When The Rockets Come

by ROBERT ABERNATHY

The trouble with trying to set up a colonial way of life really matched to the new planet is that it's a hard way of life. The majority won't like it — and they'll try to destroy it with all the brutal power of the home-planet's culture behind them.

Illustrated by Williams

Two hundred miles deep in the Boishayapustynya, there is no longer any sign that human and animal life exists on Mars. The winds rush morning and evening over the waste and whirl clouds of iron oxide dust over every trace of wheels or feet; and over this desert even the great wyverns rarely cross, and the men who dwell there are the Izgnanniki—

The expeditionary column rolled forward at forty miles an hour through a vast emptiness of sand; the wind had died an hour before, and the grinding of broad wheels, the purr of engines and the subdued mutter of men's voices—all seeming far away in the thin Martian air—were the only sounds, and the sway and dip of the thirty armored cars as they climbed and slid over the dunes, and the swirl of red dust from under their wheels, were all the motion there was. The sun was sinking in that pallid Martian sunset that looks colder than an Earthly dawn.

"We're already in Izgnannik country," said Colonel Sokol, squinting nervously through the narrow window slits of the third car. He cast a glance then at the soldier who sat across from him on the other lengthwise seat, they two alone in the rear compartment of the swaying vehicle; a long-legged, lean-faced young man in full Martian fighting gear, respirator mask and insulated suit, with an automatic rifle cradled lovingly on his knees. Vic Denning looked perfectly relaxed, almost asleep; his head nodded gently to the motion of the car. At his commander's voice, however, he opened half-shut eyes

"Think they'll be with us before long, sir?" he asked with a mildness which, in him, was deceptive.

The officer shook his head, glancing needlessly at his wrist watch. "I don't know. They may not even attack tonight; if so, our orders are to push on into the Pustynya until they do attack." He paused, cleared his throat, and asked a little hesitantly, "How do you feel?"

Denning grinned slowly, an expression which gave a boyish look to his narrow face. "Tired of riding in this bus," he said casually. "I can't wait for the Izgnanniki to get on our tails."

His lazy glance made the colonel still more nervous; he said with a conscious control over his voice, remembering too that Denning, after all, was going into far greater danger than any of the rest of them: "They probably will be soon enough."

"Fine," said Denning, a look of faint amusement in his eyes as they rested on his superior. "I'm anxious for the shooting to start. What gets me is, I've been on Mars two years now and haven't been in a decent fight."

Colonel Sokol eyed the younger man thoughtfully; as field commander, his had been the final O.K. which had selected Denning from the scanty list of volunteers for the most hazardous mission that the Colonial Staff had conceived in years. Now, at the eleventh hour before action, he saw no reason to regret the half-hunch that had made him pick the man. Of course, he knew Denning's record in the Aresia garrison: A hard drinker and a tough talker, whose brawls had landed him in trouble more than once with the civilian and military police. But now the same man was riding with all the coolness in the world toward a rendezvous with probable death.

"Shooting," Denning remarked, breaking the silence again, "is what made me leave Earth so fast. I burned holes in a couple of fat bellies that the police were fond of, down in Brasil. That was in the course of Simão Coelho Pereira's—old Quail-you's—little try at making a revolution in the old style—remember, December of 563? I got out to North America, but they'd have extradited me in no time if I hadn't slipped aboard an emigrant rocket for Mars, and enlisted in the Colonial Army here before my record caught up with me."

The colonel was startled neither by Denning's past nor by his casual recounting of it. He said slowly, "I think the successful performance of your present mission will deserve something rather special in the way of recognition by the North American government. They won't be likely to remember anything more about your past difficulties."

"Don't you think I know that?" inquired Denning superciliously. "That's the reason I volunteered. When I come back from this little party I'll be a hero. A first-class hero. I can go back to Earth if I want to, and nobody will remember a thing. But I want to live on Mars, anyway; I like it."

"Not many people do," commented Colonel Sokol. "Witness the inducements offered to settlers."

"And do you know why they don't want to live here?" demanded Denning. He looked fully awake now; he shifted the automatic rifle to a position between his knees, both big, lean hands clasping the barrel. "Because they're soft, that's why. The whole Earth is soft; it's too civilized. Do you know what? If the North American government would ship all you Earth-born so-called soldiers, that sit around and whimper to go home, back there, and raise an army from among the settlers that have been fighting this planet hand to hand for a hundred years, they'd have a real fighting army. But—they wouldn't have Mars for another decade; they won't have it forever, anyway. I'd like to be around when *that* shooting starts."

The car rolled and lurched steadily on; Colonel Sokol's eyes dwelt broodingly on the window slits and the darkening landscape of dunes that swept past beyond them, and abruptly he leaned forward and pressed the buttons which closed them all simultaneously. Outside, somewhere, the Izgnanniki might already have spotted them and be circling cautiously in to attack as soon as night fell. He did not switch off the light inside the car; their orders were to be seen and attacked, so that Vic Denning could carry out his assigned mission. Anyway, is was believed that the Izgnanniki had infrared seeing devices.

Colonel Sokol felt, in the bottom of his stomach, the beginning of that sick empty feeling which never failed to come before battle. He had known it in the war with the Zapadnyiki and in the battle of the Morje; he had never gone into a fight without a suppressed but desperate fear of the enemy and his weapons. Denning here—a different type of man. A type that the colonel knew only in theory.

"Earth is rotten," said Denning, leaning back once more in his seat. "Earth has gone soft with machines. Mars isn't so bad; Mars is new and hard and it lets only the hard stay here. I'd like to go back to Earth for a little while, sure: Earth women are nicer—they're soft too, and women ought to be soft. But Mars is the planet for men."

The colonel eyed him narrowly. He realized that the man was talking mostly to blow off steam, in a way; and his apparent sleepiness a short time before had been only another means of release from the tension that Sokol felt as a sickness in his stomach. It must be dark outside by now.

"Denning," he said softly, "you are a representative of a type which I, personally, have never met before—a type of humanity almost extinct in this year of civilization 566. If there were more like you, we might have conquered Mars twice as fast as we have; but it's been bred out of the race. The fighting blood—humanity has bred it out and killed it out with machines. The last group of men on Earth who were selected and bred to fight was the flying aristocracy of the airplane age, and most of that strain was wiped out when the atomic blast was invented, because the fightless people—the soft people, if you like—could still hate and press buttoms. Perhaps you have some of that old blood in you."

"Maybe so," acquiesced Denning, his eyes half-closed again. "I've suspected for a long time that some of my ancestors were bastards."

Colonel Sokol realized, introspectively, that talking was an outlet for him as well; it helped him forget the darkness coming down outside, and the Izgnanniki. He said soberly, "You feel, rightly no doubt, that Earth no longer has place for the fighting breed. But you've found your true place *here,* Denning, on the new frontier. There's always room for the fighters in the advance guard of civilization."

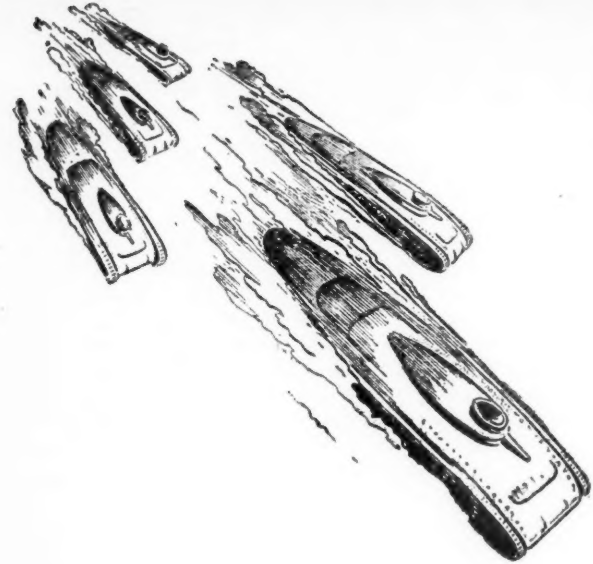
"To hell with the advance guard of civilization," said Denning, grinning his boy's grin once more. "What I want is to get in the fight."

The colonel thought: A curiously unbalanced mind; and not the least curious thing about it is that he knows his imbalance, after a fashion, and has found a fairly workable formula for living with it. A man who enjoys living most when death is at his elbow is beyond the understanding of most of us, though. But perhaps he does indeed have his place. At any rate, some time tonight he will probably leave this car and try to be captured by the Izgnanniki, in the hope of being carried alive to the hidden villages which our patrol cruisers have never been able to find and blast, and which have held up the march of Earth culture into the Pustynya for almost fifty years. And if he accomplishes that and sends the signal, then his personal hope will be to survive the atack when the rockets come, and live to be a hero. But that last is wholly immaterial to society.

Suddenly the car slithered to a halt with locked brakes, and the night became thunderous with explosions.

Colonel Sokol picked up the intercommunication radiophone at his elbow.

Vic Denning's eyes opened and he



came to his feet in the tilted car. He tucked his automatic close under one arm, and saluted—a salute with some mockery in it—with the other hand. "So long, sir, and good luck making it back to Fort 16. Don't bother wishing me any, because I make my own."

"You'll need all of it," said Sokol without looking up. He was already hunched tensely over the phone, listening and talking low and fast. His pale-blue eyes were slitted, and he flinched a little when the shells hit near.

Denning lay flat on his back, his shoulders pressed hard into a hollow in the slope of the dune. Hell was open for business in the night around him, and he was filled with the clear, fierce joy that was always new to him.

He longed to get up, though, and do some of that shooting himself. One outflung hand was clasped around the grip of his automatic rifle, but he couldn't get up and use it. The success of his mission—He had to wait here until the Izgnanniki found him.

There was a ground-shaking thud as another car blew up, adding its red glare to the lurid light that turned the desert into a place of eerie, leaping shadows. There was a brief moment of day, a thunderclap and a deafening drone, as some wheeling Earth car found a target within the range of a heavy flame gun. The quick clatter of automatics, the whoosh of rocket launchers and the sharp, thrilling bang of the bursting shells, went on without stopping; the engines had whined into motion again and the battle was moving away to the west.

Sokol was out there somewhere in the dark, if he was still alive, Sokol whose nerves had stuck out all over him just before the attack started, trying to fight his column back to safety across two hundred miles of desert. Sokol was a poor civilian in Army clothes, like most of the rest; but you had to give the guy some credit, he would go into a corner when the Colonial Staff told him to and he would fight like anybody else to get out of it.

The bullets had stopped snapping past just over where Denning lay; the engine noises and the concussions were growing more distant. He shifted position where he was, fitting his body better into the hollow his sliding feet had torn in the sand. Denning chuckled to himself, remembering how he had come down that slope. Well, the air had been full of things that screamed and whispered as they went by, and he wanted to live to be a hero, didn't he?

He went on lying there, closing his eyes; very likely, since the Izgnanniki were following the column's retreat, he wouldn't be picked up until morning, when they came back along the trail of the running battle in search of loot or survivors. In that case, maybe he'd just as well go to sleep; he would look more like a casualty asleep anyway. He tested his respirator to make sure no sand had clogged it, and ran his tongue over the radio signal device hidden cleverly behind his upper teeth. The receding gunfire and explosions lulled him.

He was really almost asleep when the three cars came careening swiftly over the crest of the dune. They were almost upon him before they saw him; two of them slammed on the brakes and slid to a sand-spraying stop, the other went on by and wheeled back to stop a few feet from him. It was a regular enveloping maneuver for one apparently dead Earthman.

The cars were Izgnannik, all right; even if Deimos hadn't been up to show their low-slung outline and their lesser size to Denning's slitted glance, nobody could mistake the noise those internal-combustion exhausts made for the whine of an Earthly electric motor. Then there were guttural words in a Martian dialect which Denning understood well enough, because like all other Martian tongues it went back to the classical Russki of Earth.

"Uzhe myertvy," said one voice, sounding impatient.

There was a metallic sound, a door thrown open, and footsteps crunched toward Denning. *"Nablyudam by,"* said another one, from a tall figure that loomed suddenly above him, indistinct in the faint moonlight. Then Denning's rifle was kicked from his hand, leaving him with bruised fingers, and an instant later the same foot landed heavily in his ribs.

Denning grunted and stirred; he forced himself to sit up slowly, groggily, mastering the passionate need to get up and start killing the man who had kicked him. The Martian stood over him with an air of triumph reflected in the very attitude of his tall figure.

"Ba! Zhivoi," he exclaimed; then, with a harsh voice of command, to Denning, *"Vstav! Ty zhemnik?"*

Denning thought it over briefly, then decided it wouldn't hurt to show that he knew the language; it might even help. And there was certainly no harm in admitting that he was an Earthman—that was obvious anyway. He answered, *"Da,"* in a thick voice that he did not need to counterfeit, for his mouth radio made d a tough proposition. *"Da, ya zhemnik . . . V bitvam zabluzhdalsha . . ."* Then, as if he had suddenly realized where he was, *"Chto jest?"* he gasped as if panic-stricken.

"My Izgnanniki," answered the man standing over him.

He says that, thought Denning, like he expected me to faint from fear. They've made their name something that a lot of Martians and even some Earth settlers tremble at, the Driven Out, the robbers and killers of the Great Desert— He sat still as if frozen by the name.

"Vstav!" ordered the Martian again, and his toe nudged Denning once more.

The Earthman climbed to his feet, stiffly, unsteadily; it was hard acting. He stood facing the other, his hands dangling; there was a weapon in the Izgnannik's hand that looked like an Earth-made flame pistol. He saw that the other two had not left the cars that loomed nearby on the slope of the dune; and he yearned to tackle the man in front of him, try to grab the flame gun and kill the other two before they could shoot. From their attitude of careless superiority he thought he would have anyway a fifty-fifty chance—but he had to think about his mission.

He could feel the Martian's eyes contemptuous upon him; then the warrior turned away to his car and flung open the door to the rear compartment. Silently, he gestured with the gun for Denning to crawl into the black interior.

Well, it was a relief to know that they planned to keep him alive for a while. Sliding into the back of the car under the menace of the pistol, he remembered the stories he had heard; some of the neighboring "reconciled" peoples said, indeed, that the wild Outcasts took prisoners, but there were other, not-so-nice stories about what happened to those prisoners rather promptly afterward.

When Denning was cramped inside the rear compartment, among lashed-down boxes that were no doubt food, tools, and ammunition, the Izgnannik closed the door until only a narrow space remained for ventilation—Denning had feared he wouldn't leave any—and locked it there. Denning's hands and feet were free, but it was all he could do to move even slightly in the stifling little space he had.

Without loss of time, the motors started up again, and the car jerked into forward motion and was quickly pitching at reckless speed over the wind-built dunes.

Denning had long known the trick of putting physical misery out of his mind; he needed it before that night's journey was done. In the lurching car the pain of his cramped muscles became wellnigh unbearable, and he had never ridden with an internal-combustion engine before; its fumes and noise became sickening. More than once, a sudden plunge over the wavelike crest of a dune flung him painfully against the other cargo in the compartment.

It went on for long hours during which he could see nothing but pitch blackness; during the infrequent stops, there were voices and metallic hammerings that could only mean they were visiting the remains of wrecked vehicles in the path of the battle, stripping them of still-useful parts. Once someone apparently wanted to throw some of the salvage in the back of the car where Denning lay; the Earthman heard a few words of explanation in the voice of the man who had kicked him, and a hand slapped jocularly on the metal door that kept him prisoner coincided with a deep laugh.

At last, after a longer period of riding, the car slowed down in the midst of a tumult of shots and of voices raised in shouting. All around was the grinding of many wheels; some time during the night the war party had gathered again for the return dash to their base. For a moment the gunfire made Denning imagine that they had run into hostile raiders; then he realized that the din was of welcome.

Nevertheless, it was almost a quarter of an hour before the lock clicked and the door was flung wide again, and the voice of his last night's captor snapped, "*Vykhod!*"

It was almost all he could do to straighten his arms and legs and stand up; he remained leaning on the car, facing the two men who stood watching him, and blinking at the pale gray light of dawn.

He cast a quick glance around; the desert seemed covered with parked cars and with men, women, even children, all busy at once—but he saw no village. The thought came to him that perhaps the Izgnanniki were true nomads, having no permanent abiding-place—though that seemed incredible in view of their mechanized equipment and the evidences of family life. But in that case, his mission was just a laugh, a sour laugh.

He had to look back at the men facing him. One of them was the tall warrior who had booted him in the ribs; a young but hard-looking face with eyes that seemed habitually narrowed behind his respirator mask; the other man was tall also, and wore a heavy cloak over the baggy-trousered coverall suit that was everybody's dress on Mars. He had a thick black beard and his face was deeply lined, though he did not look older than forty-five.

Denning couldn't read either of those faces. If they had expression, it didn't follow the same rules that you learned among Earth people for reading thoughts from faces.

For a short time there was silence as the two Izgnanniki looked the Earthman over; Denning was glad to have a little time for the circulation to seep back into his arms and legs, and for him to take a better look at the scene around. He saw now that a frenzied activity of concealment was going on; short bursts of motor noise rose among the irregular crags and boulders that here covered the desert, as men drove the cars into the sheltering shadows and covered them with heavy tarpaulins coated like them with the red iron oxide. And he saw what the women were doing; wearing broad shoes that left little track, and armed with big brooms, they were methodically sweeping over every wheel mark in the vicinity of the encampment. In an hour or less the wind and the dust would rise to wipe out every trace; but in the meantime, the Izgnanniki were taking no chances.

Denning guessed that some of those precautions were new, since the Earthmen had come with their rocketships. Until then there had been no danger from the air on Mars—it was funny; when the first crude gasoline-driven rockets had struggled across space, five hundred years ago, airplanes and radio had already been in use on Earth, but both inventions had died out here. That was simple: Neither of them worked on Mars, with the merest excuse for an atmosphere and no Heaviside layer—or more properly, with a Heaviside layer right down to the ground, so that you couldn't send radio bouncing over the Martian surface except maybe a little way at night.

In the distance he could see a jagged range of mountains that, from what knowledge he had of this part of the planet, he guessed to be the Gory Razorjenny; and nearer, not more than a couple of miles away, a glint of water caught the light of the rising sun. There, lying below the rocky plateau where the encampment was, was one of those mysterious ozheri, one of the surface lakes which still exist on Mars. Most of the irrigation system of the ancient civilization was underground; and the flow from the melting polar caps still breaks through to the surface here and there, from the uncharted channels which remain after a hundred million years. There was the water supply, here were the Izgnanniki, but where—

Then, ridiculously enough, he saw the village.

It was not so strange that his first blinking glance had missed it, though it began only a hundred yards away. The place was camouflaged almost out of existence. The huts looked like the rocks; there were windows, but those that faced the sunrise had already been closed with tight-fitting, solid plugs surfaced like the rest of the dwelling with the red sand of the desert itself. Those remaining in shadow would not break the light-and-shadow picture as seen from the air; they hardly looked adequate for ventilation, but nevertheless most of the place must be underground—there had to be storehouses, tunnels, repair shops for work on the vehicles which could not be done in the open.

The Izgnanniki had had over forty years, since their first contact with Earthmen, to perfect their concealment. They had done pretty good, said Denning to himself admiringly.

Then the black-bearded Martian spoke, in a deep voice that had the timbre of authority.

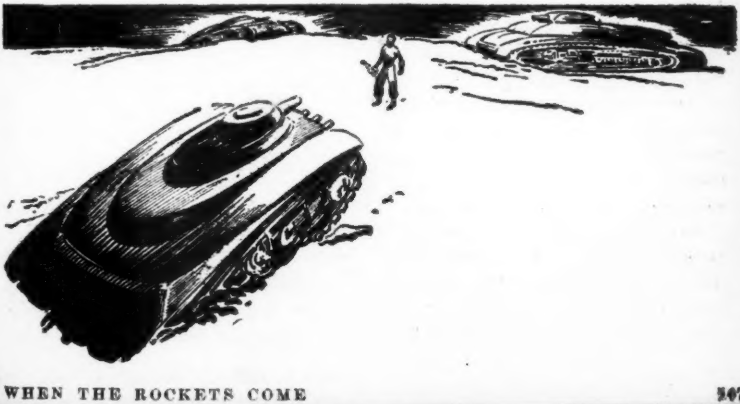
"Ponimash gdye nakhodishsha, zhemniko? Jestesh v rekami Izgnannikikh."

With something of an effort, Denning straightened up and stood without leaning on the battle car, facing the motionless cloaked figure and staring straight into the masked and bearded face.

"Yes," he answered steadily, in the Marsski language. "I know that I am in the hands of the Driven Out. What of it?"

The sky overhead was growing lighter. It was already about a minute since Denning's tongue had covertly pressed the trip on his mouth radio in a certain manner, and the signal had been hurled out at the speed of light, to be picked up by the tremendously sensitive receptors on the waiting patrol rockets somewhere up there. They would not delay.

"I am the golová," said the man with the black beard solemnly. "It is my duty, under the law of war of the Izgnanniki, to give you the choice of the prisoner. Under the law, it is the right of the captive to choose one of two things: Either to serve all his life as a slave among



our people, or to fight the death battle with one of our warriors, man to man, and if he conquers, to be accepted in the place of him whom he has slain as a warrior of the Izgnanniki, swearing obedience to the law of war upon the honor of a fighting man."

Denning took a moment to digest that formal speech. It was a crazy thing, but it appealed to something in his mind—some corresponding reservoir of quixotry in himself. And he could see how it must have worked in the past centuries to bring new blood into the isolated tribe of the Driven Out—always fighting blood. That was what the system was meant to do, and it was a scheme worthy of a society of warriors.

"Choose, Earthman," said the chief of the Izgnanniki. "Either this morning you become a lifelong slave, a branded coward—or you fight for your life against one of us, fight as the law prescribes, naked and without weapons, the *draka bezvozdushnaya.*"

The battle without air. That was good for another bit of thinking. Denning realized that all he had to do was wait a few minutes and the rockets would be here; the part of wisdom was to play out his last night's pose of fear and choose slavery. But something deep in his make-up rebelled against that, something kept needling his adrenal glands and awaking his hunger for the thrill that comes of confronting death. Otherwise, his mission was going to be accomplished practically without danger; it was pitiful.

It was then that the tall hard-faced man who had kicked Denning the night before broke in. "My chief," he said with a faintly-mantled arrogance, "I have never heard that the law of war is for the Earthmen. The Earthmen themselves obey no law."

The golová bowed his head slightly, a frown deepening the furrows in his forehead. "There is truth in what you say, Pravdivy," he admitted. "The Earthmen do not fight wars like men; instead they wait and work to invent machines that will kill other men like vermin, so that they, cowards, will not have to fight. When the flame-driven rockets first came from Earth, the days of open warfare on Mars were numbered. Yet the law is the law, and the Izgnanniki will obey it as long as there are still Izgnanniki."

"He will make the coward's choice," said Pravdivy with a faint shrug, a jeer in his voice. "He is a coward; as such he received the kicks which I gave him when we found him."

Denning had been staring at the warrior, his hands slowly clenching at his sides; now on his lips was a twisted version of his boyish grin. The former mayor of Belem, back on Earth, might have been able to interpret that twist—if the mayor had not been electrocuted by a flame gun in Denning's hands mere seconds after he first saw it.

Abruptly Denning said, "I choose the battle."

The golová's eyes returned to him

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with a jerk. His lined face was unreadable, but after a moment's silence, he said: "That is a good thing for you, Earthman, that you took the man's choice instead of the coward's. You will probably die anyway, but if you had chosen slavery, you would have died slowly and with a great deal of pain. The Izgnanniki make no slaves."

"Oh?" said Denning to himself. "Catch question, huh?" He felt an inward quiver; he didn't mind grazing death rather closely, but he liked to see it go by. He made another of a long lifetime series of vows to keep on following his instinct instead of his reason.

The golová said, "It is now your right to challenge any warrior of the tribe, save the chief, to the death battle. Choose once more, Earthman."

That was no question. Denning jerked an insulting thumb at Pravdivy, who stiffened, then slowly relaxed, looking at the Earthman with burning eyes.

"Pravdivy is my only acquaintance here," said Denning, biting off his words, "and I dislike him for his excessive generosity—with his feet."

"It is good," said the chief formally. "A warrior, being challenged, may not refuse on pain of being stripped of his weapons and sent to live with the old men." He eyed Pravdivy.

"I accept the battle," said the warrior without apparent emotion. But, as the golová turned away to call others who had finished the task of camouflaging the cars, he added in a confiding undertone, "But I shall not kill you, Earthman. I shall merely gouge out your eyes and break your bones, and leave you to die for lack of air. I have done all those things to men before."

"Then," said Denning, flexing his arms to restore circulation in his sore muscles, "it's time somebody else took over."

He always felt like wisecracking just before things broke; never so much as at times like now, when the dice were loaded both ways. The rockets were coming, but in minutes he would be pitted in the deadliest sort of duel against a powerful and hardened warrior The *draka bezvozdushnaya*—airless fight, and he knew that the Martians had long been accustomed to a pressure four or five pounds lower than Earthmen were used to breathing. Even they couldn't live in the uncompressed Martian atmosphere, but those four or five pounds could make a lot of difference.

And Denning felt the sharp, clean thrill of imminent battle, something that in his life was without equal—a thrill such as no beauty, no achievement, no possession had ever been able to give him. He sometimes thought it was only at such moments, when death was near, that he really lived.

There was a sort of arena, raggedly walled by rocks, floored with rusty sand; and there the warriors gathered round in the light of the rising sun, and there two men went swiftly to work to strip each of the combatants.

Denning glanced at the impassive faces of the perhaps two hundred men who formed the circle, and wondered how many of them had in the past participated in such a fight. They watched in silence; there was no pity and no partiality in the looks they bestowed on the two in the arena. Whoever won was the better man; only the event could show. That, thought Denning with a flash of understanding, was the way it should be. These were men of the fighting breed; Mars had made them so, the hard life that left no room for any other.

The sun was already well over the horizon, but the air that smote Denning's bare skin was like ice. Its chill made him realize more sharply just how stiff and weary he was in bone and muscle after his cramped night, how heavily the cards were stacked against him. But that didn't matter. Already one of his "seconds" was loosening his respirator helmet.

He took the last of a series of deep oxygen-storing breaths, and held it; in a pressure of three pounds to the square inch, that took a strong effort. The cold air misted his vision for a moment; he blinked his eyes rapidly, and saw Pravdivy, stripped to the skin like himself, advancing slowly toward him across the twenty feet or so of red sand.

He had time to admire the Martian's massive shoulders and muscle-ridged torso; they stood for an instant facing each other, three or four feet apart, moving nothing but their eyes as each searched the other for a weak point. For a moment Denning remembered that somewhere overhead the great space rockets were descending, armed with technical weapons of destruction that his knowledge could only guess at. Then Pravdivy closed to grapple, and the Earthman too forgot everything save the instincts of the fighting animal.

But Pravdivy came in with hands clutching to grapple; and Denning remembered that he had fists.

Even as the Martian closed on him, Denning's right lashed out, driving straight to his enemy's midriff. He had meant to follow that with a left to Pravdivy's scowling face, but the other was too fast and the first blow didn't seem to stop him at all.

They went down together on the red sand, rolling and fighting like savage cats.

In seconds the Earthman knew that it was all he could do to defend himself. It took all his strength and skill to ward off the hands and feet and knees that were trying to cripple or kill him; twice the Izgnannik came sickingly close to carrying out his promise to gouge out Denning's eyes, and more than once he came within an inch of getting one of the bone-breaking holds in which he was obviously practiced. Denning fought only to protect himself, pinning all his hope on what he thought he had heard when his one punch landed; the whistling gasp of Pravdivy's breath going out into the thin air.

The fury of battle was in both of them, sustaining their bodies against the terrific combustion of oxygen, but it couldn't go on. Denning's blood roared in his ears, a numbness began to take his limbs, and for all he could do his breath began to go out in little puffs. There came a moment, then, when he knew with a hopeless clarity that he could not ward off the Martian's next try at a killing grip.

Then that next try came, and he broke the threatening hold. And through him, giving him a last burst of strength, surged the knowledge that Pravdivy was weaker than he. Denning twisted convulsively sidewise, like a dying fish, feet he could no longer feel thrusting against the torn sand of the arena, and brought the other beneath him, one arm twisted under.

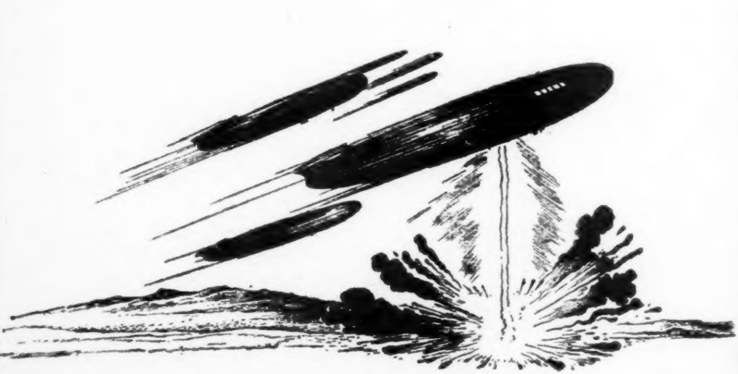
He had him now, that first punch had done it, but he couldn't do anything about it. Denning shook free and, with a mighty effort, rose shakily to his feet.

But he could hardly see the unmoving circle of warriors or the rocks or the sky; a cramping sickness was in his stomach, and his knees felt like rubber as his lungs struggled uselessly to suck in the tenuous air. Then everything was blotted out by roaring black dots, and he went down to his knees in the sand, trying to brace himself with arms that were lifeless clubs.

He was barely conscious that they were lifting him with rough swiftness, and that a respirator mask was slipped over his head. All at once, though, his breathing could work again, and he gulped great breaths; his head began to clear, his brain recovering from oxygen starvation.

They were still supporting him as a figure appeared before him; it was the golová, arms still folded impassively beneath his enveloping cloak. The bearded chieftain said solemnly:

"You have conquered, man of Earth." He said *muzh zhemny,* instead of *zhemnik,* "Earthling." "That blow to the pit of the stomach is a trick that a man might well learn."



With an effort, Denning shook off the men who were holding him up, and stood alone, swaying a little, but he stood. He grinned with boyish abandon behind the life-giving mask; at this moment life was very sweet, for never before had he come quite so close to dying.

"Now is the law of war fit for Earthmen, O chief?" he asked softly.

"You have won the battle," reiterated the golová. "Now it is your right to be accepted as a warrior of the Izgnanniki."

Denning stood there for a little while, silent, savoring the delight of breathing again and the familiar catharsis of victory. It was a little funny, that offer; the Izgnannik chief didn't seem to think for a moment that anyone, even an Earthman, might not find it an honor.

Well, wasn't it? he asked himself quizzically.

The body of Pravdivy still lay, sprawled in ungainly fashion on the sand, in the midst of the arena. Denning had killed a warrior with his bare hands, he had proved to these men of a fighting race that he was worthy to be one of them. That was something, after all. He realized suddenly that the Izgnanniki were men of his own kind, such as he had never found on Earth. On Earth, in the swarming cities, they loved money and women and ease; not one of them could know what it was to win in the *draka bezvozdushnaya* and know yourself the better man according to the desert law.

The sun was fairly high now, and Denning's vision had returned. As his eyes wandered thoughtfully past the golová, into the blue distance over the Gory Razorjenny, they caught high in the sky a glint of sun on metal.

For a moment Denning stood rigid. He had forgotten completely, forgotten that they were coming.

Then he pointed into the sky. "The rockets!" he shouted. "*Rakety!*"

In an instant every warrior was on his feet. Denning continued to point toward where he had seen the reflected flash; eyes were shaded and strained.

For perhaps half a minute the blue sky still looked empty. Then one man, then another, then all saw the space rockets; tiny dark specks, almost invisibly high, but visibly descending.

The golová stood with his cloak flung back, his lined and bearded face raised to the heavens; his gloved hand rested uselessly on the worn butt of the automatic pistol at his belt.

"They have found us!" he cried in a loud voice to them all. "Yet perhaps they will not see the village. The warriors must flee into the desert and scatter; the women and children shall remain underground, and hope—"

But even as he spoke they could already make out the long fishlike shapes trailing pale flares of atomic hydrogen, racing nearer second by second. As the men started to run en masse for the tarpaulin-covered cars among the boulders, the rockets slowed in their downward plunge and dropped slowly into a flattening trajectory that carried them over the summits of the range only twenty miles distant even as the first motor sputtered into life.

Denning stood still, numbed, staring skyward. The plan had worked beautifully, as the Colonial Staff had planned it. The direction finders in the rocketships must have located his signal within a few miles. Now they could hardly miss the village.

The golová had not followed his men; he was still standing a few feet away, watching the onrush of the aerial armada. In a low voice, half to himself, the Martian repeated an earlier phrase of his own, "When the rockets come, it is not war— Earthman, will you flee with us or wait here for your own people?"

But there was no time even for an answer. For the first rocket was going over, so low that you could see the open gun ports in its glistening belly armor; as it passed overhead the afterdrive was shut off, and the great machine coasted forword on its momentum two thousand feet above the plateau. That was so the vibration of the drive wouldn't interfere with the gunners up there—but nothing happened. The first ship was merely observing; its drive flared out again, and it climbed away as the rest came in.

Like most other people in that time of the long peace on Earth, Vic Denning had never seen a war rocket in action.

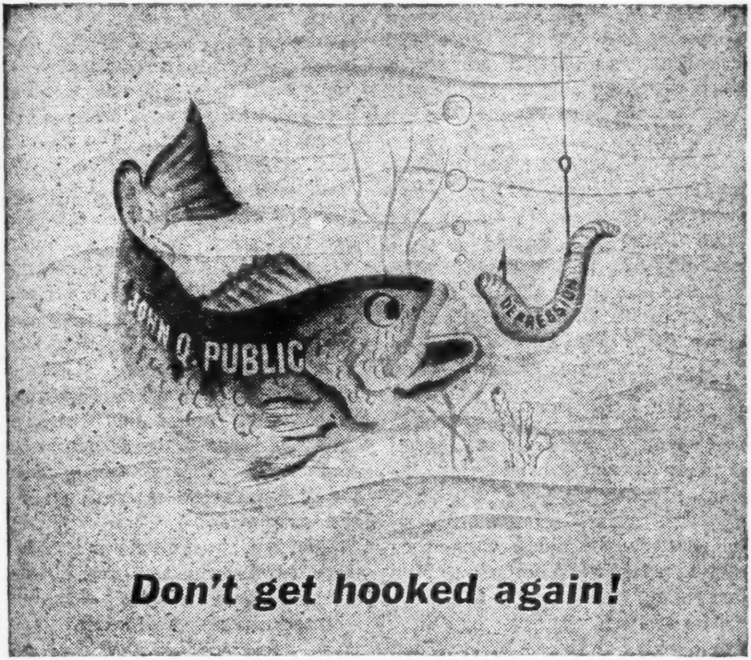
New weapons had come out of Earth's laboratories in the past hundred years, and had been outlawed by the Council of the Nations for use on Earth itself; there was almost no one outside the Council and a handful of high military officials and technical experts who knew what those weapons could do. So it was a rare opportunity for a glance at the shape of things to come, which Denning had in the next few minutes; but somehow he didn't appreciate it.

The five following rockets cut off their drives, coming over in formation perhaps a mile high; and even as they did so, the roaring of the first rolled down upon the village.

They had come in faster than sound travels on Mars, and until now they had seemed to slide through the sky on noiseless wings of flame. But now the shriek of that first ship's passage smote Denning's ears, numbing his nerves and brain; the solid plateau seemed to tremble, and the whole air screamed to the flight of that hundred-foot projectile traveling at half a mile a second.

In that same moment, the destruction began.

From the leading ship stabbed a spear of light so blinding that the day was darkened by it; it struck not at the village, but at a group of battle cars that were zigzagging away among the dunes. Where it touched the iron sand flashed into vapor, and bits of white-hot stuff



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sputtered out of the fiery cloud to fall hundreds of yards away. In the mere second before the rockets passed on and were over the village, the death ray swung a mile across the desert, and behind it a flaming slash burned brighter than the eye could bear.

Denning knew that another look would leave his vision permanently damaged, if it wasn't already; he spun about and started to run, shielding his face with his arms. Then hell exploded all around him; the atomic blast had flicked down to strike the village.

Light and incandescent vapor erupted far over his head. The blast of air that swept over him made him cry out in seared agony; he flung himself groveling into the sand, covering his head, and heard the high, triumphant screaming of the man-made thunderbolts as they plowed across the desert, destroying everything.

The rockets passed, but they would swing and come back. They would lace the plateau with flame until nothing living remained.

Or perhaps— He had heard of atomic bombs. A few of those, and even the plateau would no longer exist.

The sky was filled with thunder and weird whinings of air torn by the hurtling ships and their guns. The whole sky was a reverberating bowl where lightning leaped and crackled, aimed and vindictive, lashing down again.

He tried to burrow into the sand; red-hot particles showered down on his bare skin, and he could *feel* the glare going through him, not through his eyes but through his body. That was a light of atomic combustion, a light that ate your bones away. He realized now, finally, that those who had sent him here had never expected him to live through the attack. His was a suicide mission.

Only when the rockets had passed once more did he dare to raise his eyes and see.

The atomic blasts had ripped the underground village to pieces. That Denning lived was a miracle; the very rocks that had shielded him were split and blackened. Nothing human could be seen in the smoking rubble, not even the wreckage of a machine—only molten metal reached fiery fingers snaking from the glowing scars where the blast had struck.

His skin was agonizingly blistered by the radiation and by the scorching gusts of wind that still whipped across the desert. Far away, almost out of sight over the mountains, the rockets were circling back again, still in unbroken formation, confident, superbly invulnerable; at their height and speed no weapon that Martians had could touch them.

All at once Denning hated them. Up there within those hurtling projectiles of death were Earthmen, men who did not fight but pressed buttons instead. They were pressing buttons now, methodically wiping out a threat to the triumphant march of their safe, soft civilization.

"When the rockets come, it is not war—"

He knew now what vision had shadowed the eyes of the Martian chief, saying that.

The rockets were coming back again, and this time they would finish it.

But a few miles away, the formation veered aside; with smooth co-ordination, as if stunt flying for an open-mouthed audience, they wheeled into a tight turn and began to circle over the desert. The roar of their driving tubes came down to batter the plateau with sound; then from their belly ports the atomic blast flamed down again.

But this time, where it struck, great clouds of steam leaped far into the air, steam and other than steam, for where the blast struck directly, the water of the *ozhero* on which its power was being loosed was smashed to hydrogen and oxygen, or to stripped atoms and fragments of atoms. Fire rose with the steam, and an ear-splitting hissing came across the distance to Denning.

He was not long realizing what this new action meant. The lake boiled only for minutes, and afterward flaming clouds of evaporated rock and metal rolled up from where it had been, turning to black smoke that climbed higher and higher almost to the heights where the rockets flew, a mighty pillar of darkness that overshadowed the desolated plateau.

It was all over for the Izgnanniki. The rockets were finishing the job, wiping out of the water supply to make the place forever uninhabitable for men not equipped

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with the facilities of Earthly engineering. By now, where the *ozhero* had been, was only a great pool of hardening slag where water could never rise again.

Only a handful of warriors had escaped, and those would probably be hunted down and exterminated by the vindictive hate of the neighboring tribes.

Denning covered his burning eyes and looked no more toward the pillar of smoke. He felt sicker, more used-up than he had after the fight with Pravdivy; his head throbbed with pain, perhaps his brain had been injured by the radiations, he was battered and bruised where he had fallen among the rocks, his whole skin burned as if he had passed through flame. But over and beyond the physical pain, he felt with a helpless misery that he had seen the end of something for which he had been born out of place and out of time.

He was sitting up, his back against a glassily fused splinter of rock, when the rocket landed on the desert and a dozen crewmen armed with automatics and flame rifles pushed cautiously into the still-smoldering heaps where the village of the Izgnanniki had been.

Denning was conscious, and when he saw them coming he moved jerkily to pick up something that lay beside him on the ground. They saw that it was an automatic rifle; fumblingly, he raised the weapon to his shoulder, the muzzle pointing waveringly toward the search party, and seemed to be trying unsuccessfully to fire it.

The rocketmen scattered, closed in, and disarmed him without difficulty, the gun slipping from fingers that went suddenly limp. The rifle was useless anyway, its breech mechanism smashed by some flying fragment. He must have picked it up when he dragged himself through the wreckage to where they found him.

As two crewmen lifted Denning to lay his burned and bruised body on a stretcher, he struck at them feebly, crying, "*Ya voin* Izgnannikikh! *Ya* Izgnannik!"

On the return march, when the rescued Earthman's delirium had lapsed into near-unconsciousness, one of the men asked of the lieutenant who walked at the head of the party:

"Sir, did you hear what this guy was saying when we picked him up?"

The officer shook his head, looking toward the great torpedo shape of the rocket lying on the sand a couple of hundred yards in front of them. "I never learned Marsski. What did he say?"

"I don't know what it meant, sir," said the crewman a little hesitantly. "He must have been through plenty back there. But what he said, literally, was, "I am a warrior of the Izgnanniki! I am an Izgnannik!—that is, an Outcast."

THE END.

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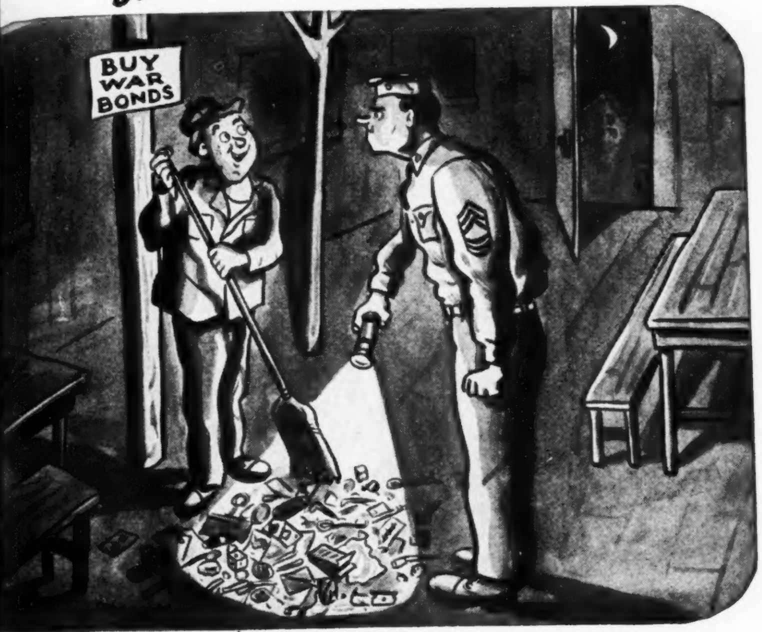
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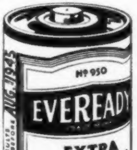
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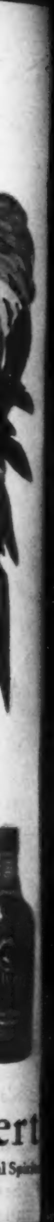
86.8 Proof. Calvert "Reserve:" 65% Grain Neutral Spirits...Calvert "Special:" 72½% Grain Neutral Spi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